

U. S. DEPARTMENT OF THE INTERIOR
PROTOTYPE OIL SHALE LEASING PROGRAM

TRACT
TRACT C-b

QUARTERLY REPORT #3

(Through May 31, 1975)

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Submitted to:

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By:

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Atlantic Richfield Company
Shell Oil Company, Operator
The Oil Shale Corporation

JULY 15, 1975



SHOUT
SHARE **IT**



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Alluvial Well Pump Test

Alluvial Well Pump Test

II B-9 AQUIFER DATA - PUMPING TESTS

Lower Aquifer Pumping Test

Quarterly Report #2 contains a detailed description of the objectives and history of the upper zone phase of the aquifer pumping test at AT-1. It was stated that the upper zone test was terminated in mid-January when a drilling rig was brought back to the site, and AT-1 deepened. This action, in fact, began the preparation for testing the lower zone. The test well AT-1 was drilled to the base of the mine zone and casing was installed and cemented in place. The well was then drilled an additional 270 feet, downward into the "lower zone aquifer." A pump with water production capability of 150 gallons per minute was installed at a depth of 1430 feet below ground surface. (It was determined during the deepening of AT-1 that the lower aquifer could not sustain rates in excess of 150 gpm. The upper aquifer, by comparison, was capable of yielding greater than 400 gpm.)

Water produced during the deepening operation had a relatively low dissolved solids content, 1500 mg/l and a fluoride content of approximately 20 mg/l. This was similar in character to waters directly above the Mahogany zone in the upper aquifer. During the test, fluoride and boron levels averaged 20 mg/l and 1 to 2 mg/l, respectively. During the lower zone test, the dissolved solids content of production water never exceeded 1200 mg/l.

Background pressure readings were taken for several days before the test was actually commenced. Almost immediately, however, an equipment problem forced a restart. After restart, the test well maintained a rate of approximately 120 gpm for 17 days. At that time, the generator unit failed and the initial pumping phase of the test was terminated. A recovery period lasted for eight days and was followed by a pulse-pumping phase before final shut-in. A complete chronology of events for the lower aquifer test is given in Table II B-51.

An overview of pressure response data generated during the lower aquifer test revealed that strong anisotropic or directional permeability exists. The orientation of this anisotropy in the lower aquifer can be described as following the general direction of AT-1 to SG-6. This is approximately normal to the directional permeability shown in the upper zone test. Computer analysis has not been initiated as yet because pressure data are still being reduced and will not be available in suitable format for some time. Manual plots and interpretation of the pressure responses in the lower aquifer, however, have yielded transmissivity values as shown in Tables II B-52 and II B-53. More complete permeability values are being calculated by the Leasee's reservoir simulation group.

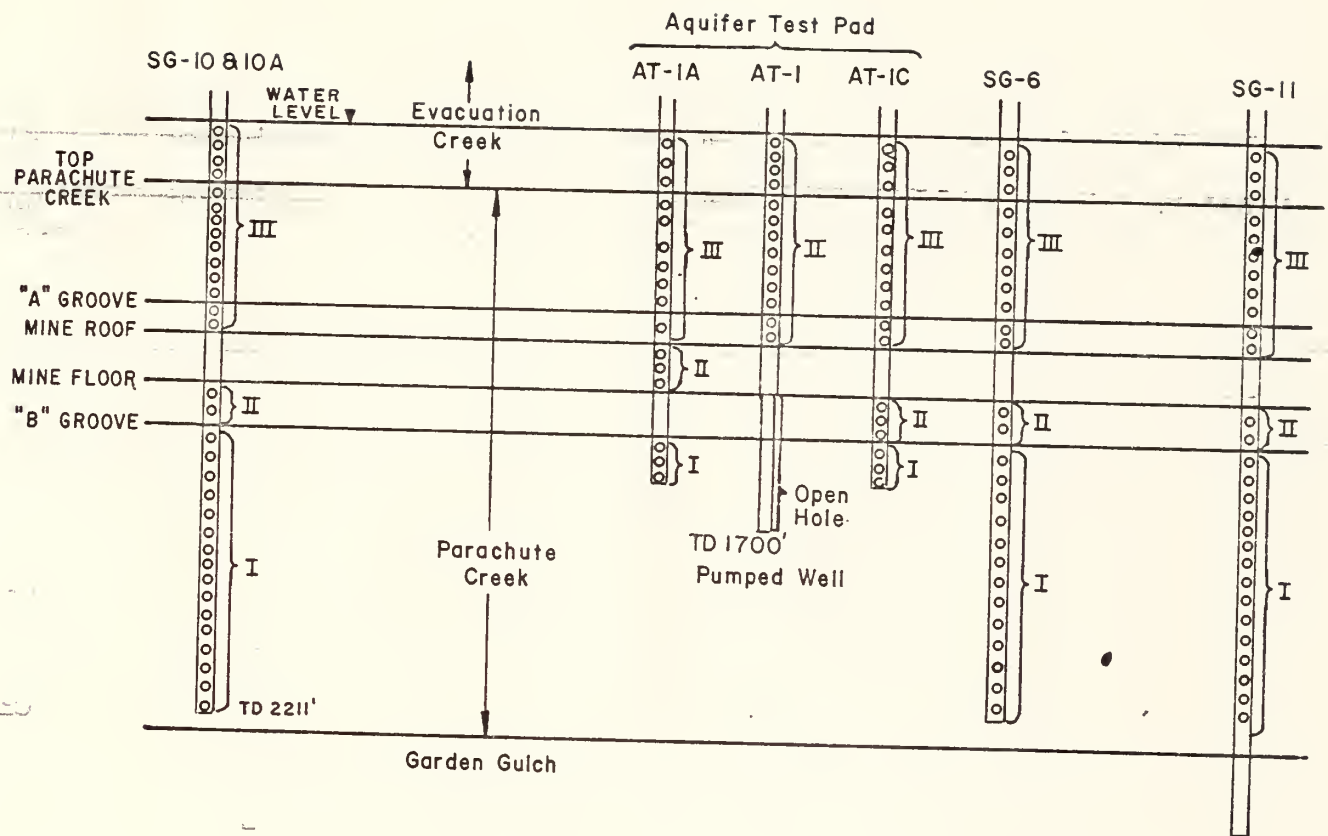


Figure
II B-14

SCHEMATIC CROSS-SECTION LOWER AQUIFER PUMP TEST

C-b TRACT, COLORADO

SCALE: None

 Perforated Interval

 II Tubing String Number

TEST RESULTS					TEST DATE	
NO.	TEST	RESULT	UNIT	REMARKS	DATE	TIME
1	TEST 1	100	100			
2	TEST 2	100	100			
3	TEST 3	100	100			
4	TEST 4	100	100			
5	TEST 5	100	100			
6	TEST 6	100	100			
7	TEST 7	100	100			
8	TEST 8	100	100			
9	TEST 9	100	100			
10	TEST 10	100	100			
11	TEST 11	100	100			
12	TEST 12	100	100			
13	TEST 13	100	100			
14	TEST 14	100	100			
15	TEST 15	100	100			
16	TEST 16	100	100			
17	TEST 17	100	100			
18	TEST 18	100	100			
19	TEST 19	100	100			
20	TEST 20	100	100			
21	TEST 21	100	100			
22	TEST 22	100	100			
23	TEST 23	100	100			
24	TEST 24	100	100			
25	TEST 25	100	100			
26	TEST 26	100	100			
27	TEST 27	100	100			
28	TEST 28	100	100			
29	TEST 29	100	100			
30	TEST 30	100	100			
31	TEST 31	100	100			
32	TEST 32	100	100			
33	TEST 33	100	100			
34	TEST 34	100	100			
35	TEST 35	100	100			
36	TEST 36	100	100			
37	TEST 37	100	100			
38	TEST 38	100	100			
39	TEST 39	100	100			
40	TEST 40	100	100			
41	TEST 41	100	100			
42	TEST 42	100	100			
43	TEST 43	100	100			
44	TEST 44	100	100			
45	TEST 45	100	100			
46	TEST 46	100	100			
47	TEST 47	100	100			
48	TEST 48	100	100			
49	TEST 49	100	100			
50	TEST 50	100	100			
51	TEST 51	100	100			
52	TEST 52	100	100			
53	TEST 53	100	100			
54	TEST 54	100	100			
55	TEST 55	100	100			
56	TEST 56	100	100			
57	TEST 57	100	100			
58	TEST 58	100	100			
59	TEST 59	100	100			
60	TEST 60	100	100			
61	TEST 61	100	100			
62	TEST 62	100	100			
63	TEST 63	100	100			
64	TEST 64	100	100			
65	TEST 65	100	100			
66	TEST 66	100	100			
67	TEST 67	100	100			
68	TEST 68	100	100			
69	TEST 69	100	100			
70	TEST 70	100	100			
71	TEST 71	100	100			
72	TEST 72	100	100			
73	TEST 73	100	100			
74	TEST 74	100	100			
75	TEST 75	100	100			
76	TEST 76	100	100			
77	TEST 77	100	100			
78	TEST 78	100	100			
79	TEST 79	100	100			
80	TEST 80	100	100			
81	TEST 81	100	100			
82	TEST 82	100	100			
83	TEST 83	100	100			
84	TEST 84	100	100			
85	TEST 85	100	100			
86	TEST 86	100	100			
87	TEST 87	100	100			
88	TEST 88	100	100			
89	TEST 89	100	100			
90	TEST 90	100	100			
91	TEST 91	100	100			
92	TEST 92	100	100			
93	TEST 93	100	100			
94	TEST 94	100	100			
95	TEST 95	100	100			
96	TEST 96	100	100			
97	TEST 97	100	100			
98	TEST 98	100	100			
99	TEST 99	100	100			
100	TEST 100	100	100			

100% PASS
 100% PASS
 100% PASS

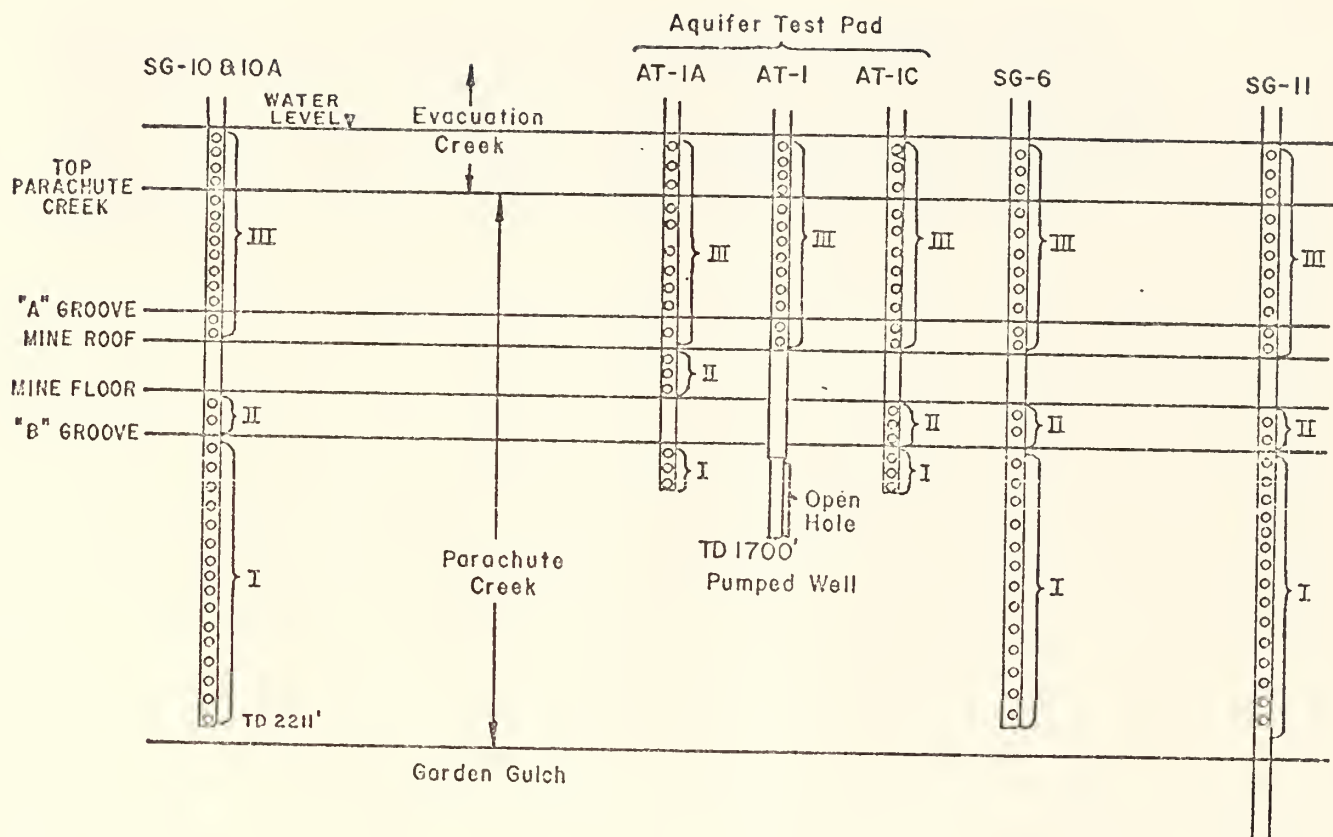
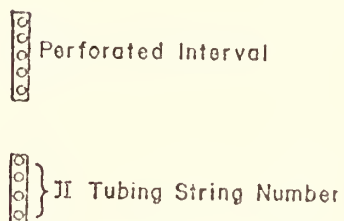


Figure II B-14

SCHEMATIC CROSS-SECTION
LOWER AQUIFER PUMP TEST

C-b TRACT, COLORADO

SCALE: None



Date		Time		Location		Remarks	
10-20-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-21-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-22-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-23-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-24-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-25-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-26-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-27-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-28-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-29-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-30-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30
10-31-20	10:00	10:15	10:30	10:45	11:00	11:15	11:30

With respect to potential aquifer interconnection, it was observed that pressure gauges in the upper zone showed no response to the pumping in the lower zone, in spite of large drawdown of lower aquifer water levels during the pumping of AT-1. Water levels in the upper aquifer continued to recover throughout the lower zone test. This is an expected response, if the two aquifer systems are hydraulically separated by the Mahogany zone; water levels in the upper zone would be expected to recover or rise as a response to the termination of pumping of the upper aquifer.

Supplemental graphs have been provided which illustrate the manual data interpretation conducted to date (Pages II B-1088 through II B-1157). Pressure (psi) is plotted versus time for each of the well strings monitored during the lower zone tests. Additional data in the form of computer reduced water level responses and pressure responses is currently being generated and is not available for reporting.

TABLE II B-51
LOWER AQUIFER PUMP TEST

Sequence of Events

6-hour surge test drawdown (systems test) 2-5-75 (12 P.M.-6 P.M.)

surge test recovery 2-5-75 (6 P.M.) to 2-15-75 (5:20 P.M.)

Original start of drawdown 2-15-75 (5:20 P.M.) to 2-17-75 (12:45 P.M.)

(generator failure)

Recovery Period 2-17-75 (12:45 P.M.) to 2-21-75 (12:00 P.M.)

Initial drawdown 2-21-75 (12:00 P.M.) to 3-10-75 (10:00 A.M.)

17 days pumping

Initial recovery 3-10-75 (10:00 A.M.) to 3-18-75 (12:00 P.M.)

8 days shut in

Pulse test drawdown 3-18-75 (12:00 P.M.) to 3-26-75 (12:00 P.M.)

8 days pumping

Final recovery 3-26-75 (12:00 P.M.) to 4-15-75 (12:00 P.M.)

20 days shut in

Pulled pump and instruments 4-15-75

Set up limited data collection network in AT1-c, SG-6, SG-10, and SG-11
5-7-75 through 5-14-75 changed upper strings to Stevens digital
recorders, lower and middle strings using pressure monitor on Sperry
systems.

LOWER AQUIFER PUMP TEST
DRAWDOWN AND RECOVERY CURVES

TABLE II B-52

TRANSMISSIVITY AND STORAGE COEFFICIENT VALUES

LOWER AQUIFER PULSE TEST - DRAWDOWN PHASE

WELL NO.	DRAWDOWN COMPUTATIONS	Horizontal Permeability
AT-1	T = 359 gpd/ft. early stage T = 532 gpd/ft. middle stage T = 756 gpd/ft. final stage	153.5 millidarcys
AT-1A (String #1)	T = 465; S = 5×10^{-4}	94.4 millidarcys
AT-1A (String #2)	Interpretative technique is not applicable	
AT-1C (String #1)	T = 219; S = 5×10^{-5} early stage Instrument drift during final stage	
AT-1C (String #2)	T = 316; S = 2×10^{-5} early stage T = 513; S = 6×10^{-7} final stage	104.2 millidarcys
AT-1D (String #2)	T = 271; S = 3×10^{-5} early stage T = 327; S = 7×10^{-7} final stage	66.4 millidarcys
SG-6 (String #1)	Slight downward response	
SG-6 (String #2)	T = 442; S = 8×10^{-5} final stage	89.7 millidarcys
SG-10 (String #1)	T = 1468; S = 2×10^{-4} T = 811; S = 1×10^{-4}	164.6 millidarcys
SG- (String #2)	No response	
SG-11 (String #1)	No response	
SG-11 (String #2)	Overall downward trend	



TABLE II B-53

TRANSMISSIVITY and STORAGE COEFFICIENT VALUES

LOWER AQUIFER PUMP TEST

Well No.	Initial Drawdown	Initial Recovery
AT #1	T = 310 g/d/ft. Initial T = 460 Secondary T = 380 Tertiary	T = 160 g/d/ft. Initial T = 320 Secondary
AT #1A (String #1)	T = 441; S = 3.11×10^{-4} T = 338; S = 4.56×10^{-4}	T = 435; S = 5.64×10^{-4} T = 335; S = 8.11×10^{-4}
AT #1A (String #2)	No Valid Response	No Valid Response
AT #1C (String #1)	T = 129; S = 1.52×10^{-4} T = 260; S = 2.24×10^{-5}	T = 1125; S = 1.80×10^{-4} T = 255; S = 3.22×10^{-5}
(String #2)	T = 173; S = 5.82×10^{-5} T = 275; S = 2.04×10^{-5} T = 376; S = 3.77×10^{-6}	T = 157; S = 9.44×10^{-5} T = 340; S = 1.98×10^{-5}
AT #1D (String #1)	T = 143; S = 1.08×10^{-4} T = 348; S = 8.63×10^{-6}	T = 136; S = 1.18×10^{-4} T = 325; S = 2.14×10^{-5}
SG - 6 (String #1)	T = 1430; S = 4.52×10^{-4} T = 620; S = 3.87×10^{-4}	T = 2800; S = 7.38×10^{-4}
(String #2)	T = 1520; S = 6.86×10^{-5} T = 574; S = 5.62×10^{-5} T = 305; S = 6.66×10^{-5}	T = 400; S = 7.53×10^{-5}
SG - 10 (String #1)	T = 490; S = 6.06×10^{-5}	T = 950; S = 1.13×10^{-4} T = 846; S = 1.11×10^{-4}
(String #2)	No Response	Very Slight Downward Response
SG - 11 (String #1)	No Response	No Response
(String #2)	T = 1065; S = 1.69×10^{-3}	No Recovery-Downward Response



Time in hours since pump turned off.



$$T_1 = \frac{264Q}{2.5}$$

$$\Delta S = 315 - 227 = 88 = 203.3'$$

$$= \frac{264 \times 125}{20.3}$$

$$T_1 = 1609 \text{ d/ft}$$

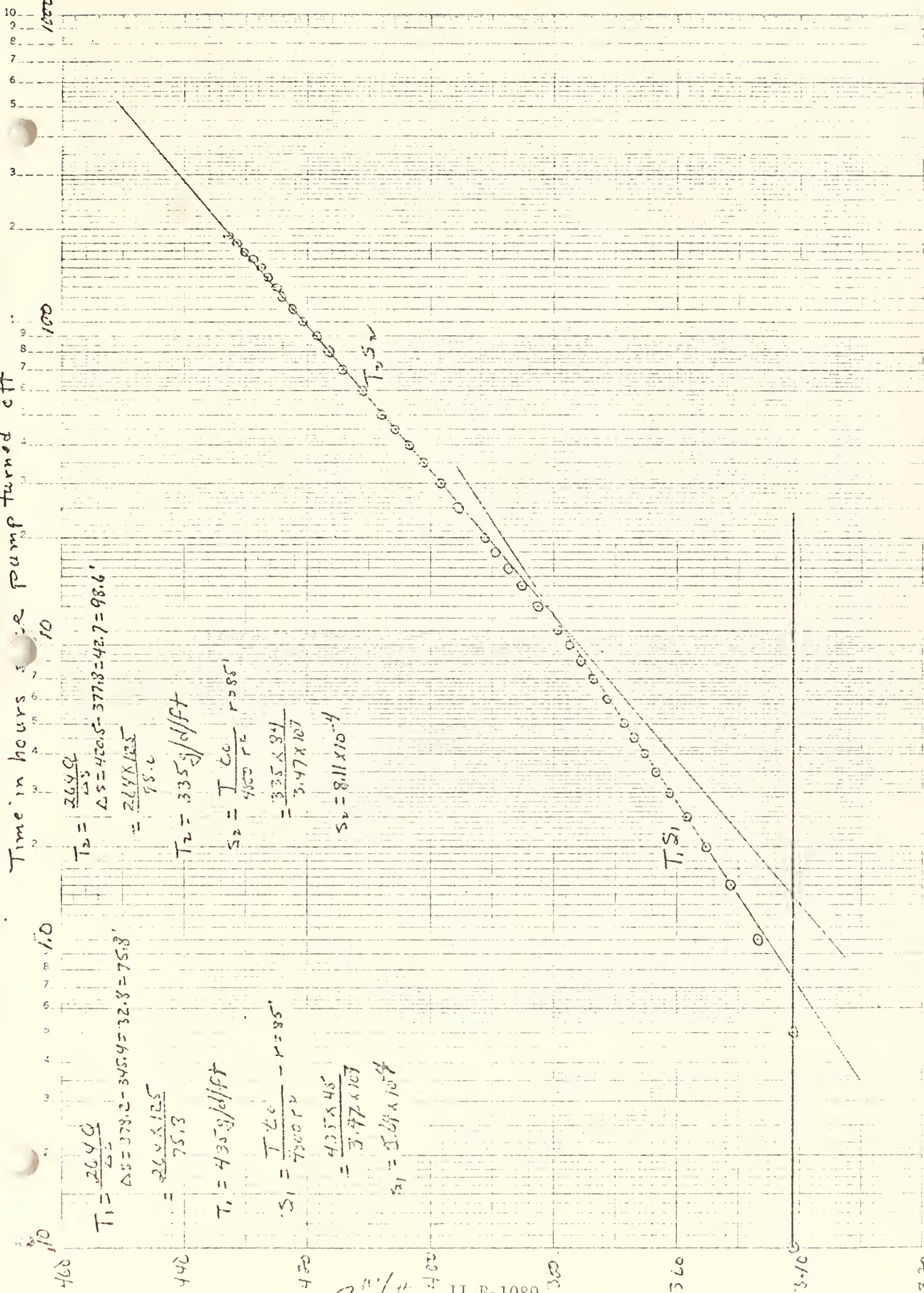
$$T_2 = \frac{264Q}{2.5}$$

$$\Delta S = 352 - 307 = 45 = 104'$$

$$= \frac{264 \times 125}{10.1}$$

$$T_2 = 3209 \text{ d/ft}$$

Time in hours since pump turned off



$$T_2 = \frac{2640}{\Delta S}$$

$$\Delta S = 420.5 - 377.8 = 42.7 = 98.6'$$

$$= \frac{2640 \times 125}{98.6}$$

$$T_2 = 3359 \text{ d/ft}$$

$$S_2 = \frac{T_2 c}{4800 r^2} = 85'$$

$$= \frac{3359 \times 94}{3.47 \times 10^7}$$

$$S_2 = 8.11 \times 10^{-4}$$

$$T_1 = \frac{2640}{\Delta S}$$

$$\Delta S = 378.2 - 345.4 = 32.8 = 75.8'$$

$$= \frac{2640 \times 125}{75.8}$$

$$T_1 = 4359 \text{ d/ft}$$

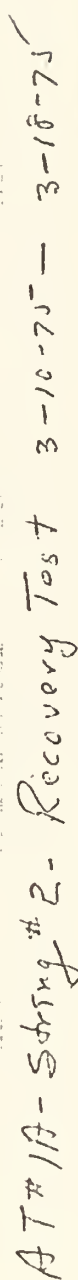
$$S_1 = \frac{T_1 c}{7900 r^2} = 85'$$

$$= \frac{4359 \times 48}{3.47 \times 10^7}$$

$$S_1 = 5.64 \times 10^{-4}$$

AT #1 A - String #1 Recovery Test 3-10-75 - 3-18-75

10 — — — — — 2237
9 — — — — —



۱۰۰

Time in hours since pump turned off

400

$$T_1 = \frac{2649}{25}$$

$$DS = 364 - 237 = 127 = 213.4$$

$$= \frac{2649 \times 125}{293.7}$$

$$T_1 = 112.5 \text{ g/d/ft}$$

$$S_1 = \frac{T_1}{4300 \times 10^2} \quad r = 102$$

$$= \frac{112.5 \times 793}{497 \times 10^7}$$

$$S_1 = 1.30 \times 10^{-4}$$

10

$$T_2 = \frac{2649}{25}$$

$$DS = 419 - 363 = 56 = 128.4$$

$$= \frac{2649 \times 125}{128.4}$$

$$T_2 = 255 \text{ g/d/ft}$$

$$S_2 = \frac{T_2}{4300 \times 10^2} \quad r = 102$$

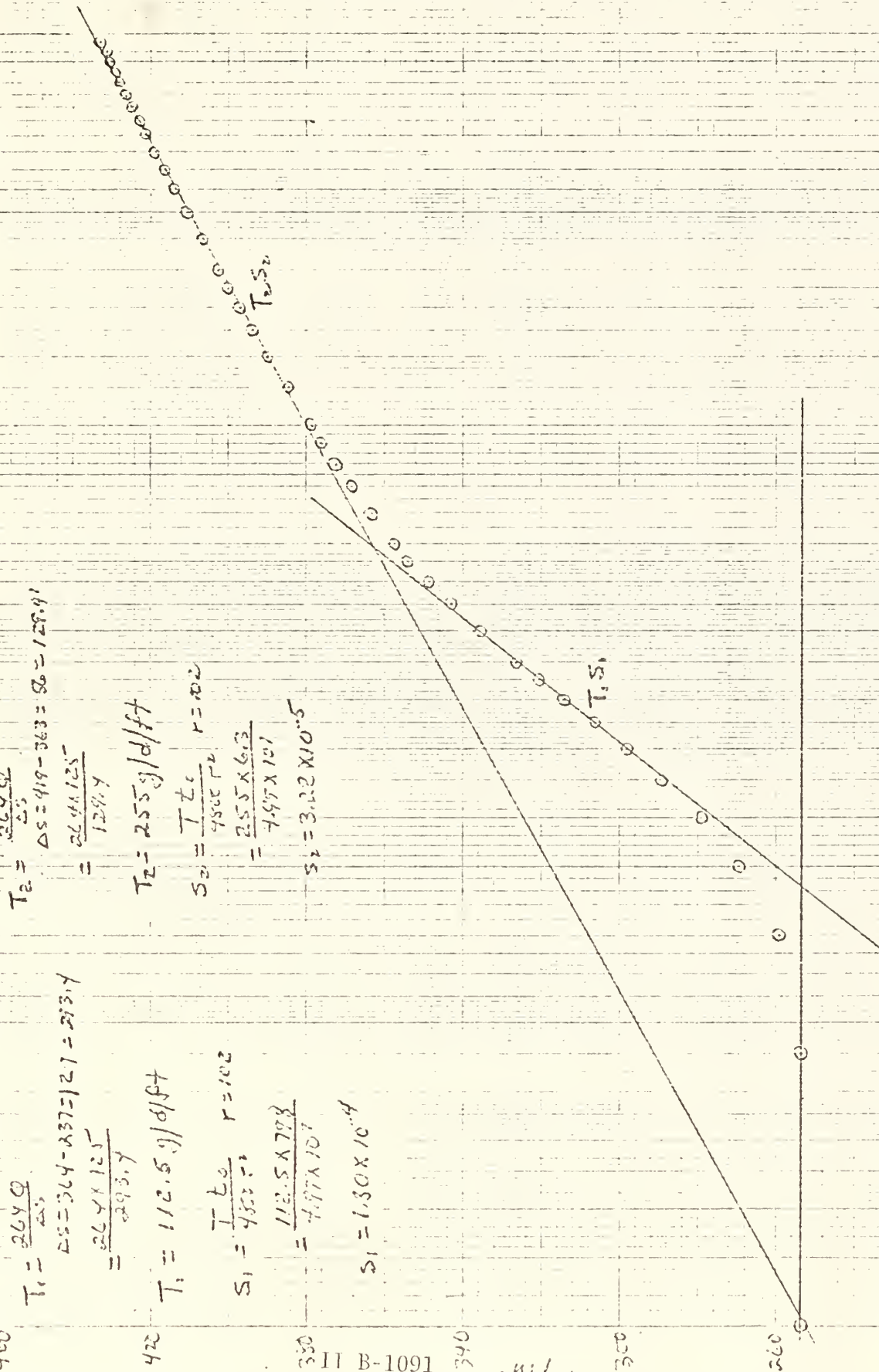
$$= \frac{255 \times 6.3}{497 \times 10^7}$$

$$S_2 = 3.22 \times 10^{-5}$$

10

100

1000



AT-1C String #1. Recovery Test 3-10-75 — 3-18-75

Time in hours since pump turned off



$$T_1 = \frac{2649}{0.5} = 5298$$

$$S_1 = \frac{2649 \times 125}{210.2} = 1579$$

$$T_2 = \frac{2649}{0.5} = 5298$$

$$S_2 = \frac{2649 \times 125}{4500} = 739$$

$$S_2 = \frac{340 \times 2.9}{4.94 \times 10^7} = 1.98 \times 10^{-5}$$

$$S_1 = \frac{1.57 \times 30}{4.94 \times 10^7} = 9.44 \times 10^{-5}$$

$$S_1 = 9.44 \times 10^{-5}$$

$$S_2 = 1.98 \times 10^{-5}$$

$$T_2 S_2$$

$$T_1 S_1$$

AT#1/C String #2 Recovery Test 3-10-75 — 3-18-75

Time in hours since pump Turned off

10 9 8 7 6 5 4 3 2 1 0

$$T_1 = \frac{2640}{2.5}$$

$$\Delta S = 346 - 245 = 105 = 242.6'$$

$$= \frac{2640 \times 125}{242.6}$$

$$T_1 = 136.9 \text{ d/ft}$$

$$S_1 = \frac{T_1 t_c}{4520 r^2} \quad r = 127'$$

$$= \frac{136.9 \times 127.2}{4520 \times 16129}$$

$$S_1 = 1.18 \times 10^{-4}$$

$$T_2 = \frac{2640}{2.5}$$

$$\Delta S = 384 - 340 = 44 = 101.6'$$

$$= \frac{2640 \times 125}{101.6}$$

$$T_2 = 325.9 \text{ d/ft}$$

$$S_2 = \frac{T_2 t_c}{4520 r^2} \quad r = 127'$$

$$= \frac{325.9 \times 51.1}{7794107}$$

$$S_2 = 2.14 \times 10^{-5}$$

100

$T_{2.52}$

$T_{1.51}$

$t_c = 0.85$

II B-1093

#11/2

AT#1D - Spring #1 Recovery Test 3-10-75 — 3-18-75



Time in hours since pump turned off

10 9 8 7 6 5 4 3 2 1 100 1000

$$T = \frac{264 \text{ GP}}{2.3}$$

$$\Delta S = 432.8 - 477.7 = 511 = 11.3'$$

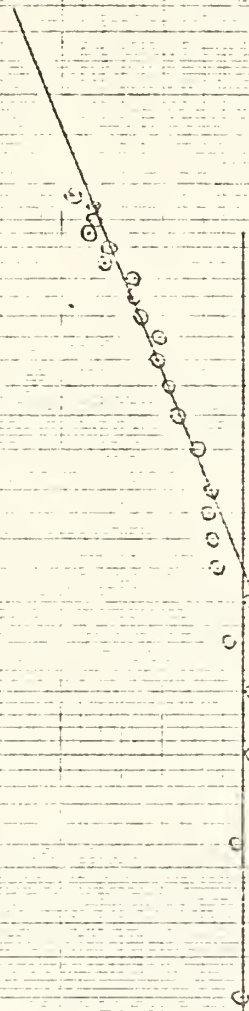
$$= \frac{264 \times 1.25}{11.3}$$

$$T = 2800 \text{ g/d/ft}$$

$$S = \frac{T \cdot L}{400 \cdot r} \quad r = 12891$$

$$= \frac{2800 \times 2100}{400 \times 12891}$$

$$S = 7.38 \times 10^{-4}$$



SG-6 #1 string Recovery Test 3-10-75 - 3-18-75

Time in hours since pump turned off

430

$$T = \frac{26.4 \times 10^4}{125}$$

$$\Delta S = 401.8 - 372.3 = 35.5 = 82.0'$$

$$= \frac{26.4 \times 125}{82}$$

$$T = 400.9 / d / ft$$

$$S = \frac{T}{400.9} \quad r = 1289$$

$$= \frac{36.4 \times 10^4}{9.97 \times 10^4}$$

$$S = 7.53 \times 10^{-5}$$

410

400

390

II B-1095

380

370

SG-6 String #2 Recovery Test 3-10-75 — 3-18-75

Time in hours since pump turned off

10

10

10

100

100

$$T = \frac{2640}{\Delta S}$$

$$\Delta S = 43.5 - 420.4 = 15 = 34.7'$$

$$= \frac{2640 \times 12.5}{34.7}$$

$$T = 9528 / 41.5$$

$$S = \frac{T t_0}{4800 r^2} \quad r = 2334$$

$$= \frac{9528 \times 3120}{4800 \times 2334^2}$$

$$S = 1.13 \times 10^{-4}$$

$$T_2 = \frac{2640}{\Delta S}$$

$$\Delta S = 16.9 \text{ ft} = 39.0 \text{ ft.}$$

$$= \frac{2640 \times 12.5}{39}$$

$$= 846 \text{ gms/ft}$$

$$S = \frac{T t_0}{4800 r^2} \quad t_0 = 5640 = 3360 \text{ min}$$

$$S = \frac{846 (3360)}{4800 (2334)^2}$$

$$S = 1.11 \times 10^{-4}$$

11 B-1096

430

420

SG-10 String #1 Recovery Test 3-10-75 ~ 3-18-75



turned off

Time in hours since pump

10

1.0

10

100

1000

649

647

11/11/75

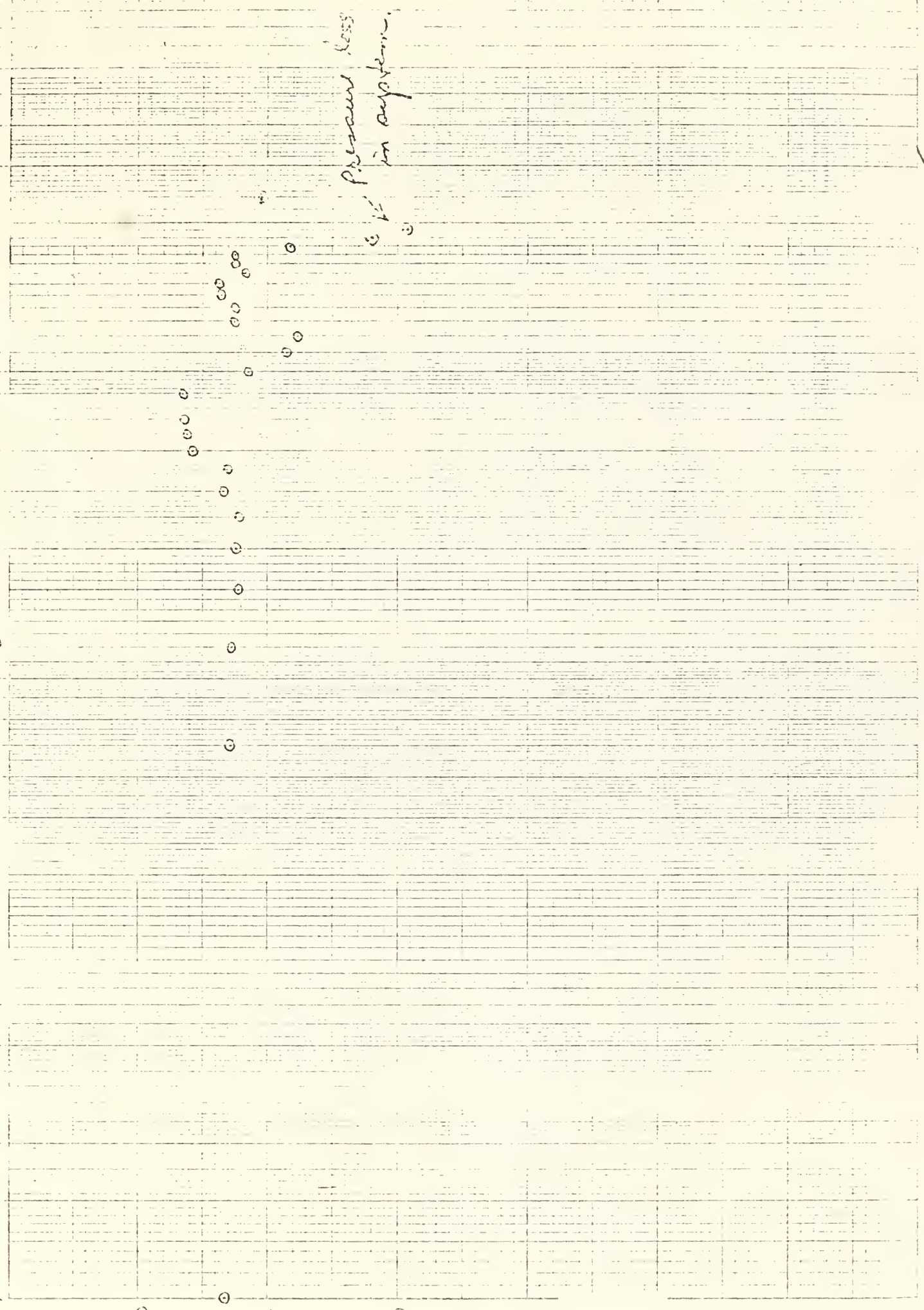
647

11 B-1097

SG-10 String #2 Recovery Test 3-10-75 — 3-18-75

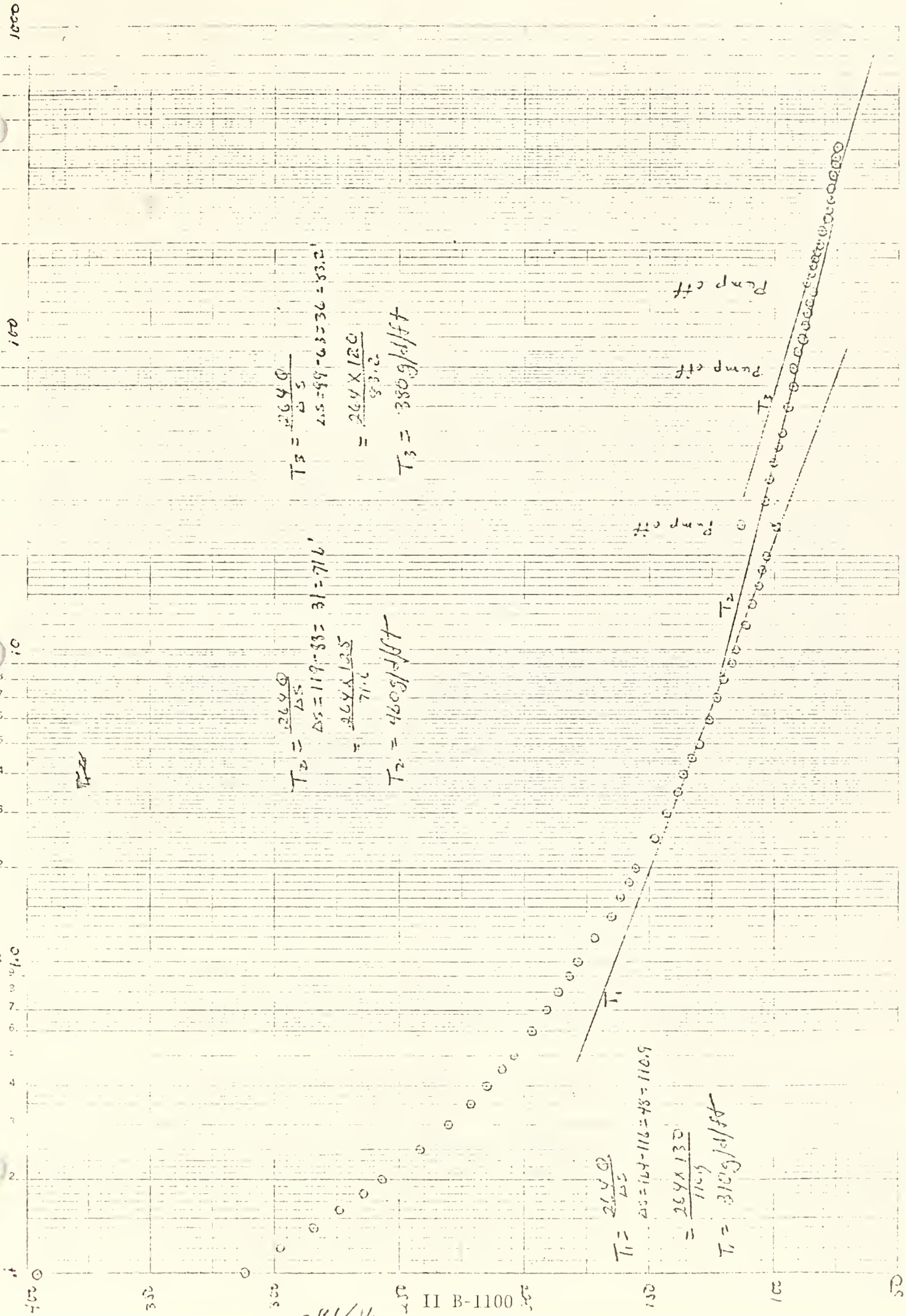
Time in hours since Pump Turned off

10
9
8
7
6
5
4
3
2
1
0



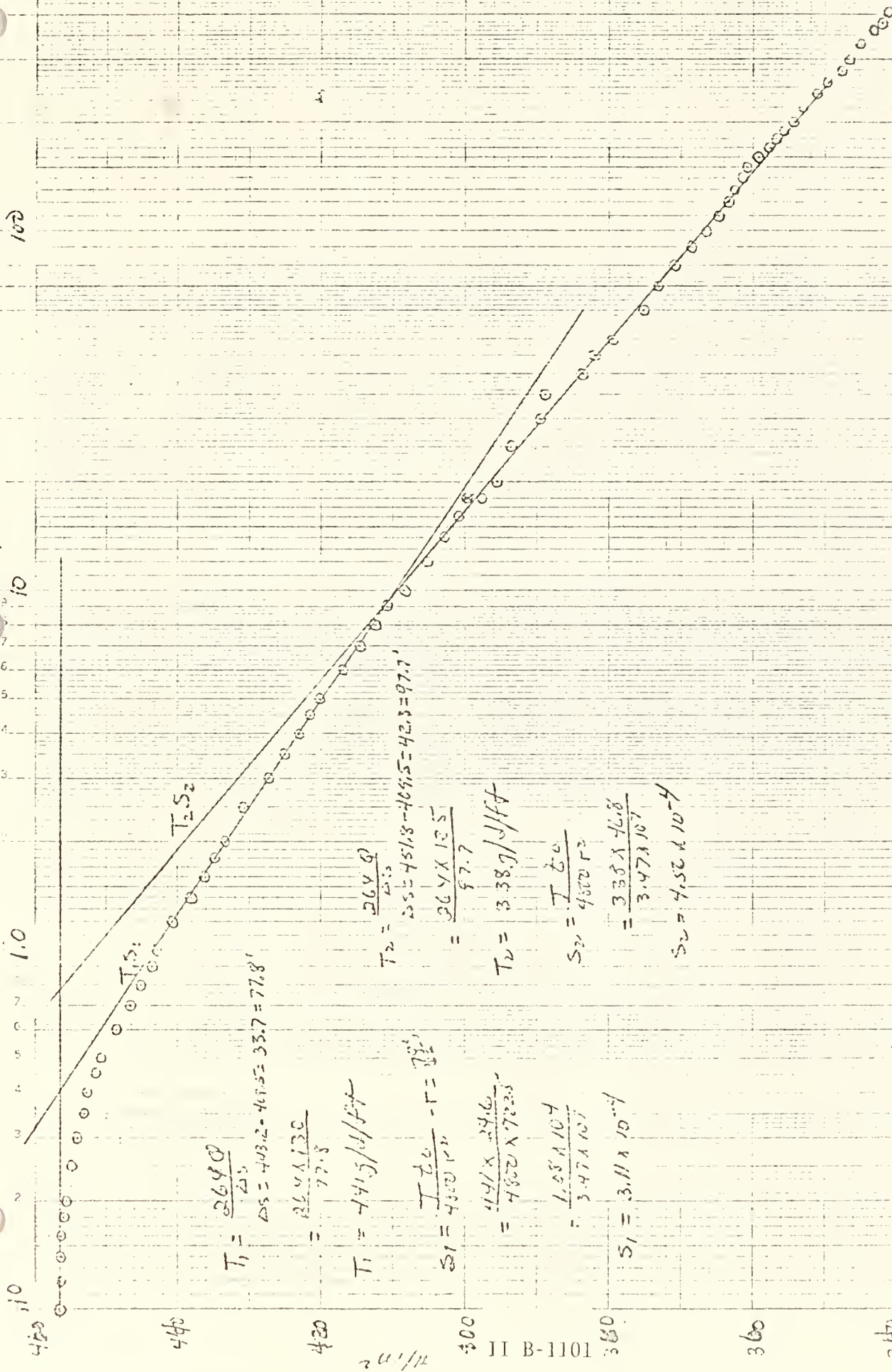
56-11 String #1 Recovery Test 3-10-75 - 3-18-75

Time since pump turn on in hours



AT #1 - Draw down test. 2-24-75 - 3-10-75

Time in hours since pump turned on



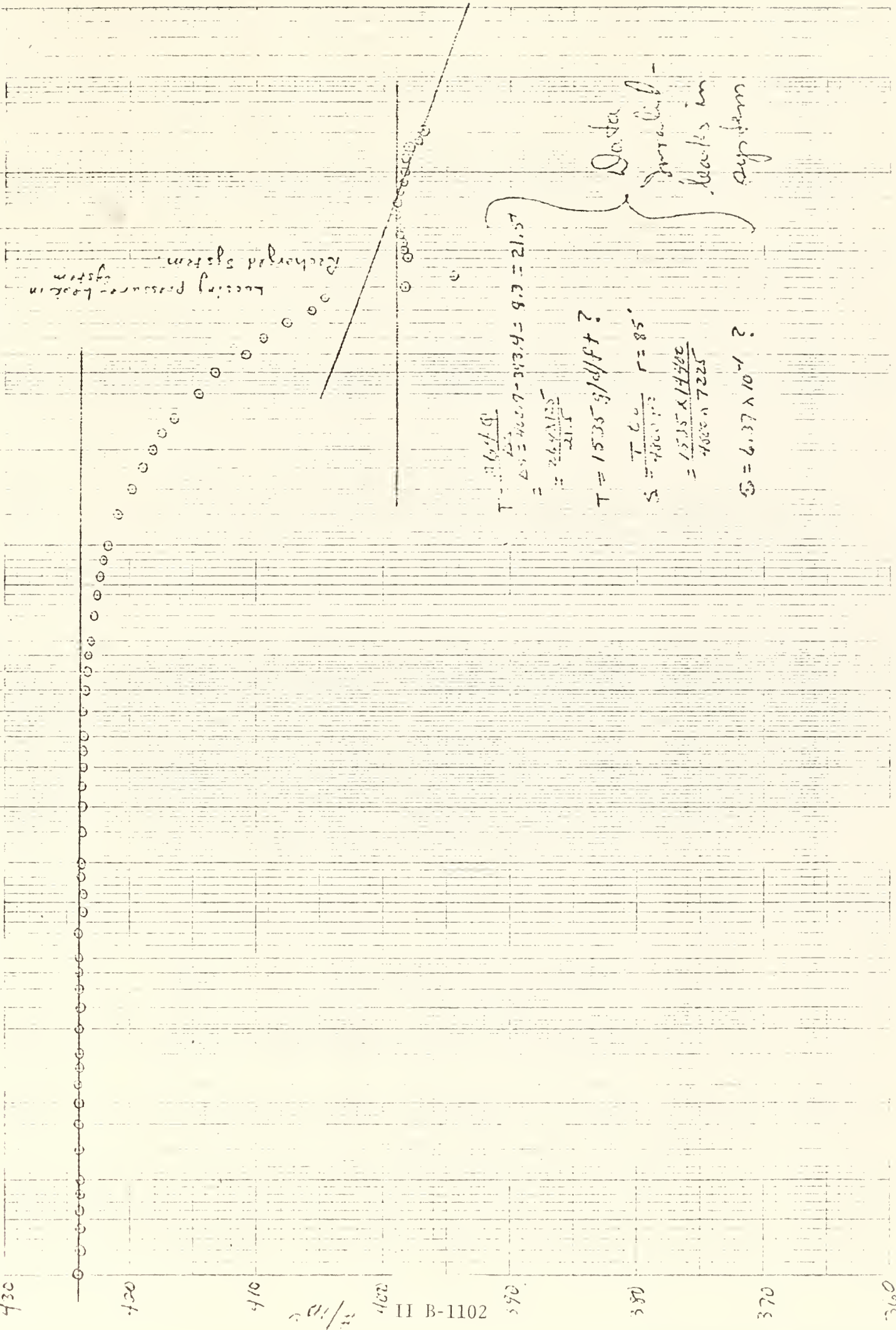
AT-1A-String #1 Drawdown Test - 2-28-75 - 3-10-75

Time in hours since pump turned on

1.0

10

100



$$T = \frac{15.35}{4000 \times 7.225} = 4.37 \times 10^{-4}$$

$$S = \frac{15.35 \times 14.7}{4000 \times 7.225} = 6.37 \times 10^{-4}$$

$$T = 15.35 \text{ g/dft} ?$$

$$S = \frac{15.35}{4000 \times 7.225} = 5.3 \times 10^{-4}$$

$$T = 15.35 \text{ g/dft} ?$$

$$S = \frac{15.35 \times 14.7}{4000 \times 7.225} = 6.37 \times 10^{-4}$$

Time in hours since pump turned on.

1000

100

10

100

3

2

1

0

0

0

0

0

0

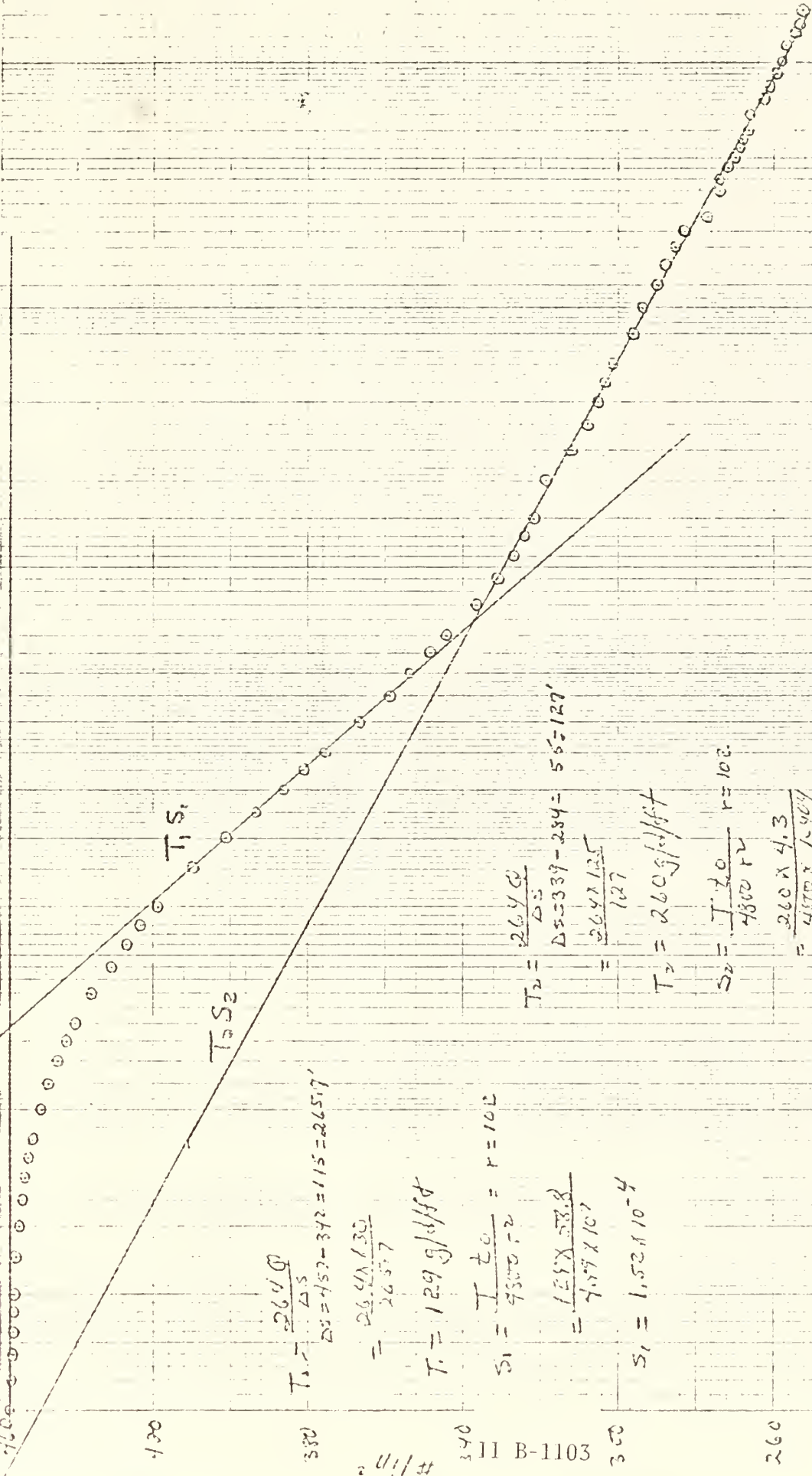
0

0

0

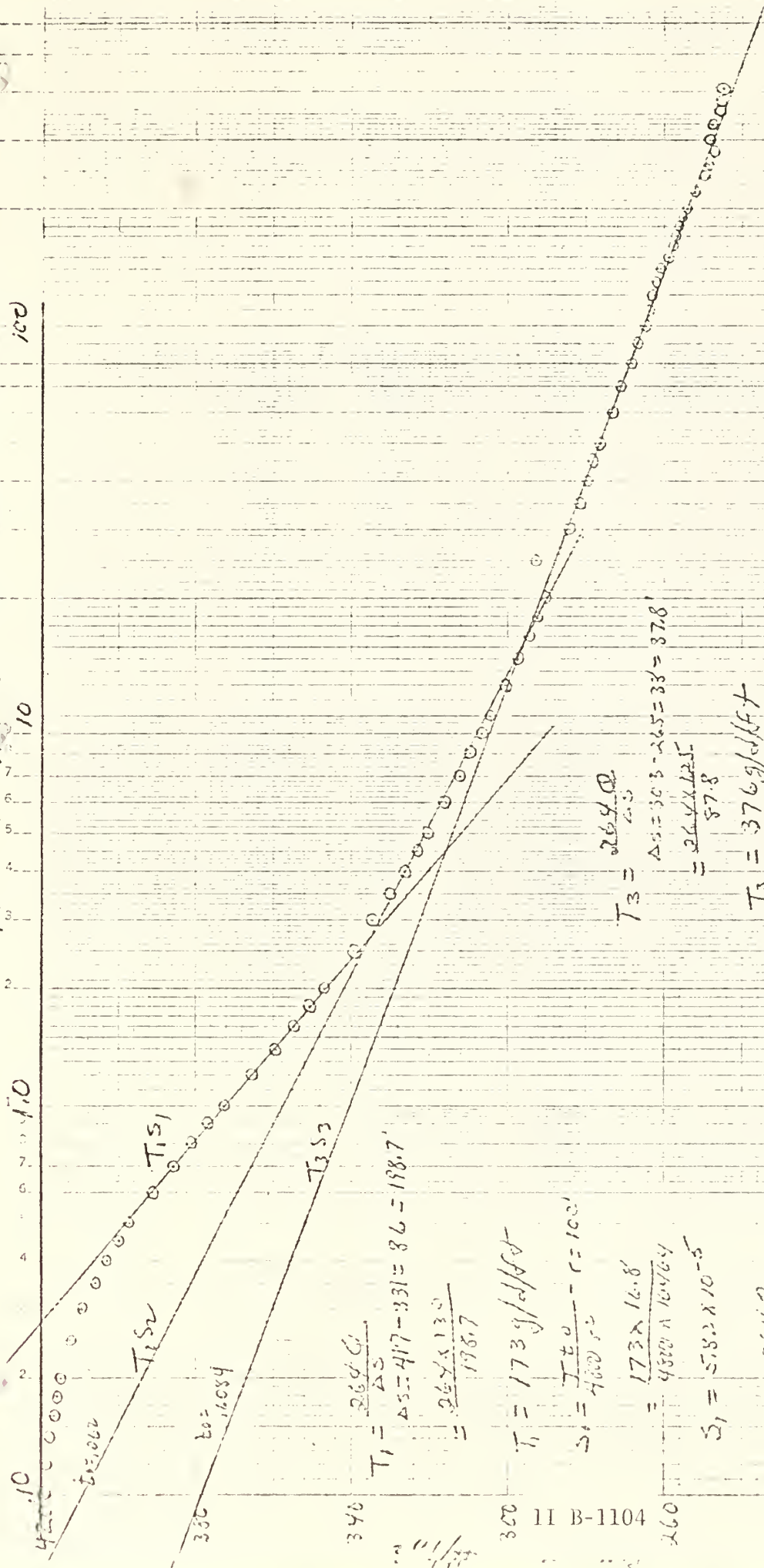
0

0



AT#C - string # / Drawdown test 2-21-75 - 3-10-75

Time in hours since pump turned on.



$$T_1 = \frac{2640}{\Delta S}$$

$$\Delta S = 417 - 331 = 86 = 198.7'$$

$$= \frac{2640 \times 130}{198.7}$$

$$T_1 = 173 \text{ g/s/ft}$$

$$S_1 = \frac{T_1 \cdot r}{4800 \text{ ft}^2} = \frac{173 \times 16.8'}{4800 \times 10464}$$

$$S_1 = 5.82 \times 10^{-5}$$

$$T_2 = \frac{2640}{\Delta S} = \frac{358 - 306}{120.1'} = \frac{2640 \times 125}{120.1}$$

$$T_2 = 275 \text{ g/s/ft}$$

$$S_2 = \frac{T_2 \cdot r}{4800 \text{ ft}^2} = \frac{275 \times 3.7}{4800 \times 107}$$

$$S_2 = 2.04 \times 10^{-5}$$

$$T_3 = \frac{2640}{\Delta S}$$

$$\Delta S = 303 - 265 = 38 = 37.8'$$

$$= \frac{2640 \times 125}{37.8}$$

$$T_3 = 376 \text{ g/s/ft}$$

$$S_3 = \frac{T_3 \cdot r}{4800 \text{ ft}^2} = \frac{376 \times 150}{4800 \times 10464}$$

$$S_3 = 3.77 \times 10^{-6}$$

AT #1C - String #2 Drawdown Test 2-28-75-3-10-75

Time in hours since pump turned on.



198

$t_D = 0.052 \text{ hrs}$

T, S_1

T, S_2

$$T_1 = \frac{2640}{25.2}$$

$$\Delta S = 420 - 316 = 104 = 240.2'$$

$$= \frac{2640 \times 1.25}{240.2}$$

$$T_1 = 143 \text{ g/d/ft}$$

$$S_1 = \frac{T_1 L_0}{400 \text{ ft}} - r = 127'$$

$$= \frac{143 \times 53.8}{7.74 \times 10^7}$$

$$S_1 = 1.08 \times 10^{-4}$$

$$T_2 = \frac{2640}{25.2}$$

$$\Delta S = 316 - 275 = 41 = 94.7'$$

$$= \frac{2640 \times 1.25}{94.7}$$

$$T_2 = 348 \text{ g/d/ft}$$

$$S_2 = \frac{T_2 L_0}{400 \text{ ft}}$$

$$= \frac{348 \times 1.92}{7.74 \times 10^7}$$

$$S_2 = 3.63 \times 10^{-6}$$

AT #1D - string #1 Drawdown Test 2-28-75 - 3-10-75

Time in hours since pump turned on

1. 490

$$T_1 = \frac{2640}{\Delta S}$$

$$\Delta S = 433.8 - 411.1 = 10.4' = 240'$$

$$= \frac{264 \times 130}{24}$$

$$T_1 = 1430 \text{ g/d/ft}$$

$$S_1 = \frac{T_1 \cdot t_1}{4300 \cdot r^2} \quad r = 1239$$

$$= \frac{1430 \times 2520}{4300 \times 1.66 \times 10^6}$$

$$= \frac{3.6 \times 10^6}{7.97 \times 10^7}$$

$$S_1 = 4.52 \times 10^{-4}$$

$$T_2 = \frac{2640}{\Delta S}$$

$$\Delta S = 487.6 - 463.6 = 240 = 55.4'$$

$$= \frac{264 \times 130}{55.4}$$

$$T_2 = 620 \text{ g/d/ft}$$

$$S_2 = \frac{T_2 \cdot t_2}{4300 \cdot r^2} \quad r = 1289$$

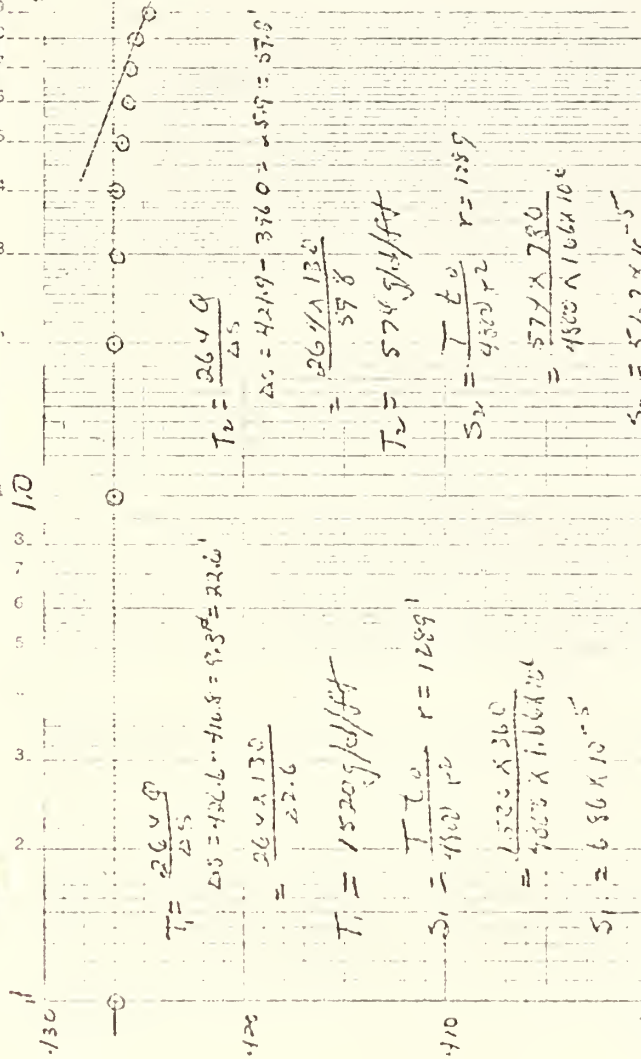
$$= \frac{620 \times 4980}{7.97 \times 10^7}$$

$$S_2 = 3.87 \times 10^{-4}$$

Instrument change?

1. 490

Time in hours since pumping began.



$$T_1 = \frac{26.4 Q}{\Delta S}$$

$$\Delta S = 130.6 - 10.8 = 119.8 = 119.8'$$

$$= \frac{26.4 \times 130}{119.8}$$

$$T_1 = 1520.9 \text{ gal/ft}$$

$$S_1 = \frac{T_1 t_0}{4.8 t_0 r^2} \quad r = 1289'$$

$$= \frac{1520.9 \times 360}{4.8 \times 1.66 \times 10^6}$$

$$S_1 = 6.86 \times 10^{-5}$$

$$T_2 = \frac{26.4 Q}{\Delta S}$$

$$\Delta S = 126.0 - 37.2 = 88.8 = 88.8'$$

$$= \frac{26.4 \times 130}{88.8}$$

$$T_2 = 305.9 \text{ gal/ft}$$

$$S_2 = \frac{T_2 t_0}{4.8 t_0 r^2}$$

$$= \frac{305.9 \times 1740}{4.8 \times 1.66 \times 10^6}$$

$$S_2 = 5.31 \times 10^{-5}$$

$$S_3 = \frac{5.31 \times 10^5}{7.77 \times 10^5}$$

$$S_3 = 6.66 \times 10^{-5}$$

$$T_2 = \frac{26.4 Q}{\Delta S}$$

$$\Delta S = 421.9 - 336.0 = 85.9 = 85.9'$$

$$= \frac{26.4 \times 130}{85.9}$$

$$T_2 = 574.9 \text{ gal/ft}$$

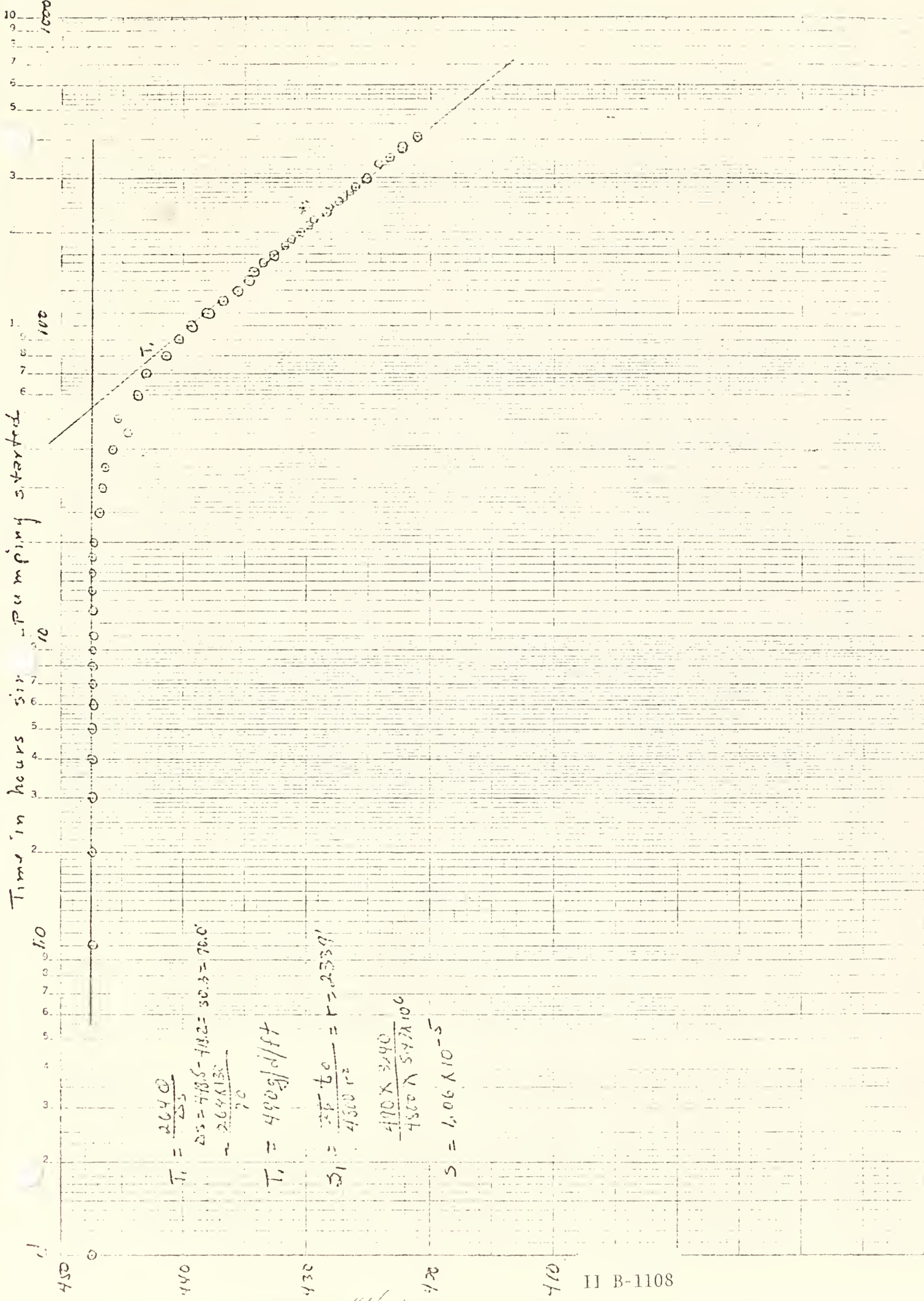
$$S_2 = \frac{T_2 t_0}{4.8 t_0 r^2} \quad r = 1289'$$

$$= \frac{574.9 \times 780}{4.8 \times 1.66 \times 10^6}$$

$$S_2 = 5.62 \times 10^{-5}$$

56-6 #2 string Drawdown Test - 2-27-75 - 3-10-75

Time in hours since pumping started



$$T_1 = \frac{2640}{25}$$

$$25 = 418.5 - 18.2 = 30.3 = 70.0$$

$$T_1 = 4909 \text{ ft}$$

$$S_1 = \frac{25 \cdot 60}{4500 \cdot r^2} = r = 2.539'$$

$$\frac{490 \times 240}{4500 \times 5.47 \times 10^6}$$

$$S = 1.06 \times 10^{-5}$$

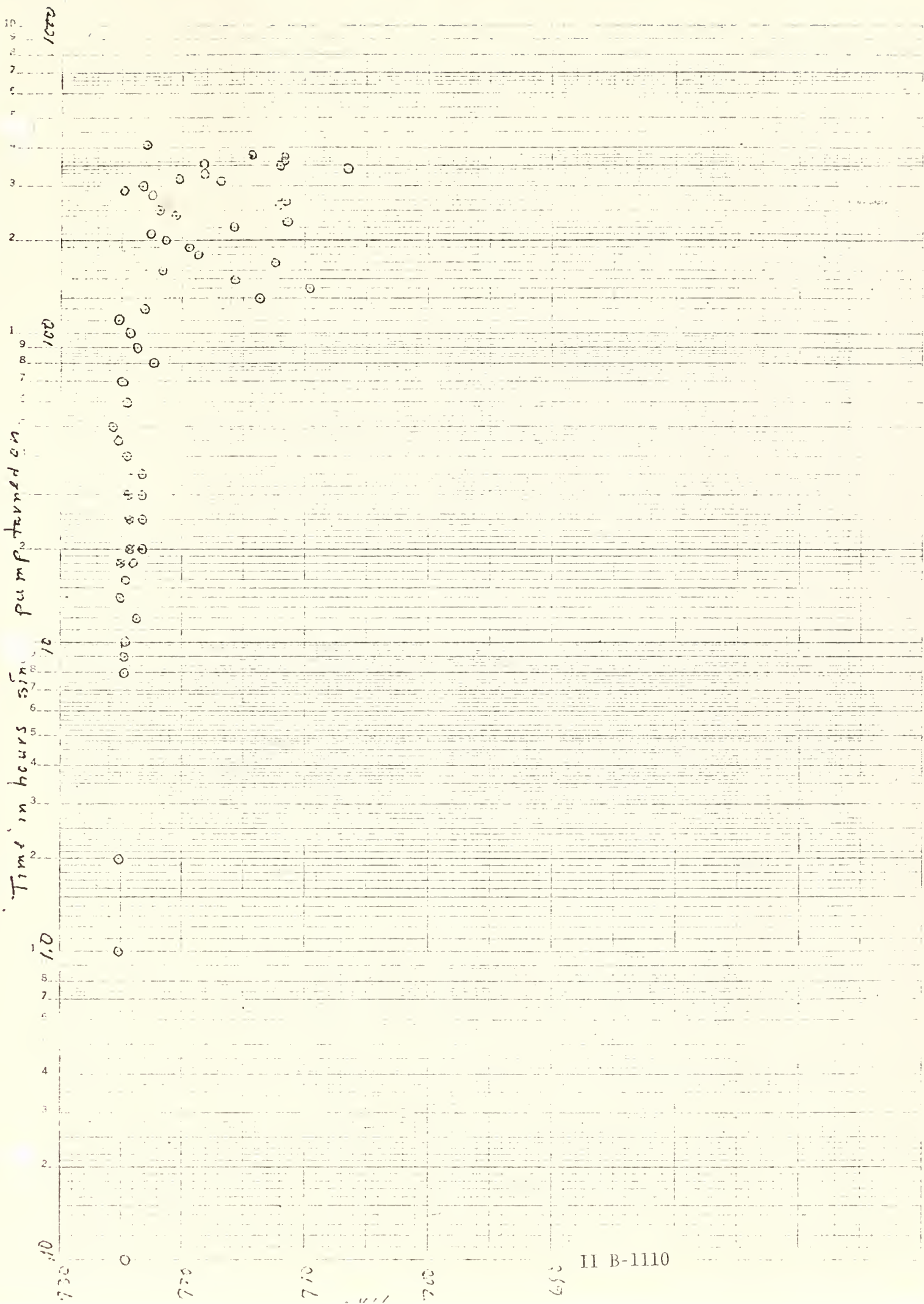
56-10 - #1 string. Drawdown Test 2-27-75 - 3-10-75

三

56-10 #25 thing Drawdown Test 2-24-75 - 3-10-75

16, 6013

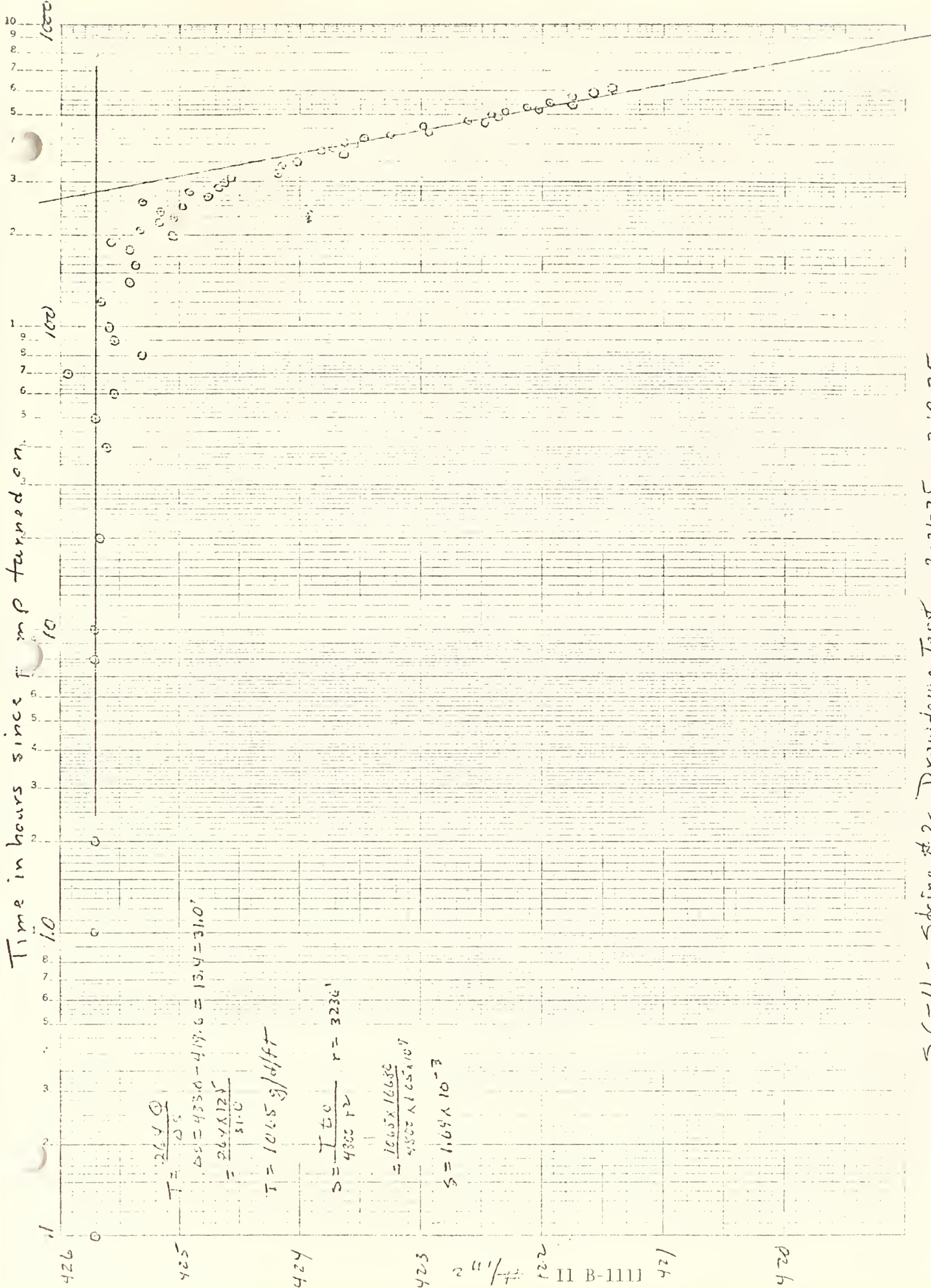
Time in hours since pump started on



11 B-1110

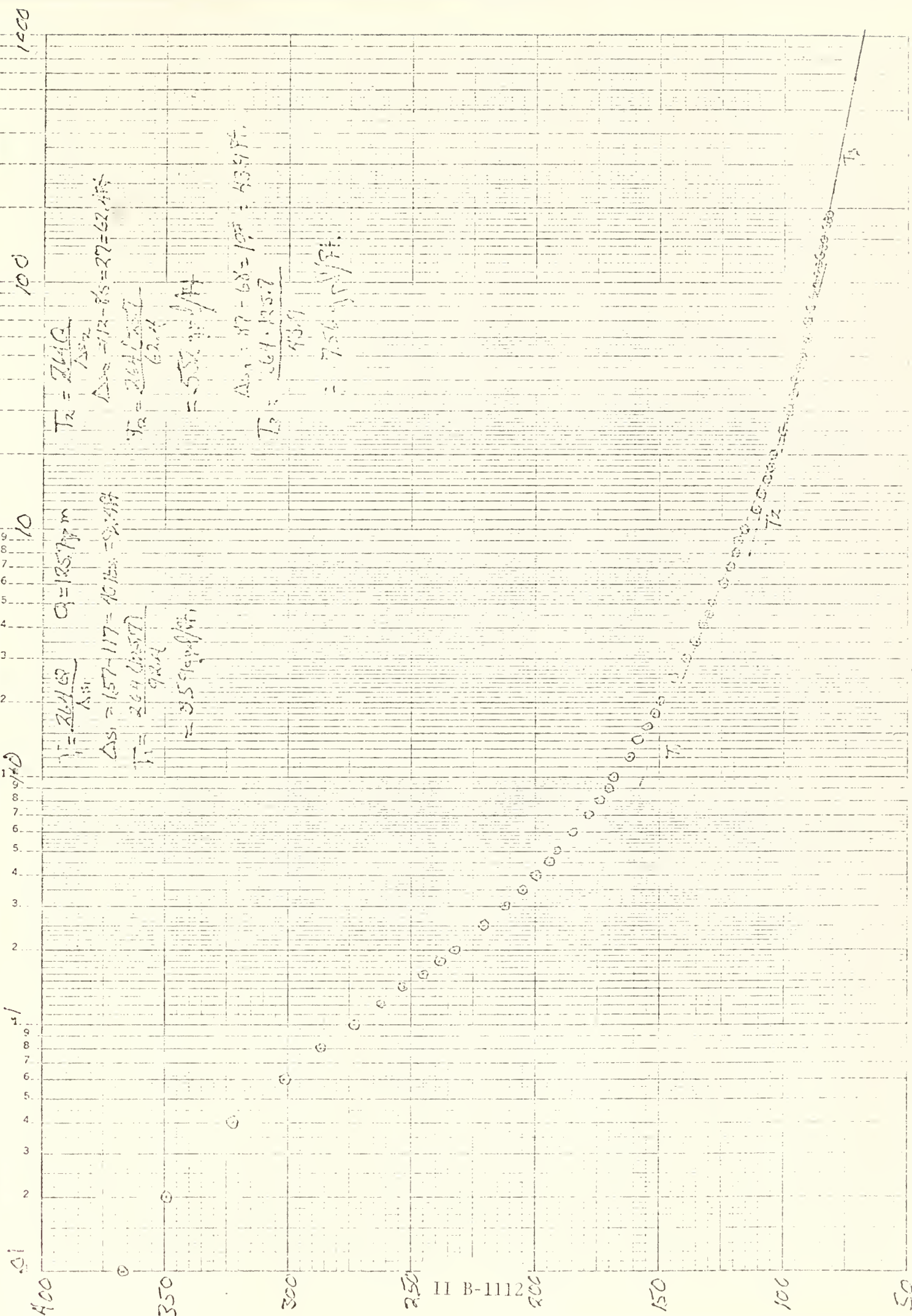
56-11 Siding #1 Drawdown Test 2-21-75 - 3-10-75

Time in hours since pump turned on



36-11 - Spring #2 Drawdown Test 2-21-75 - 3-10-75

Time in Hours since pump turned on

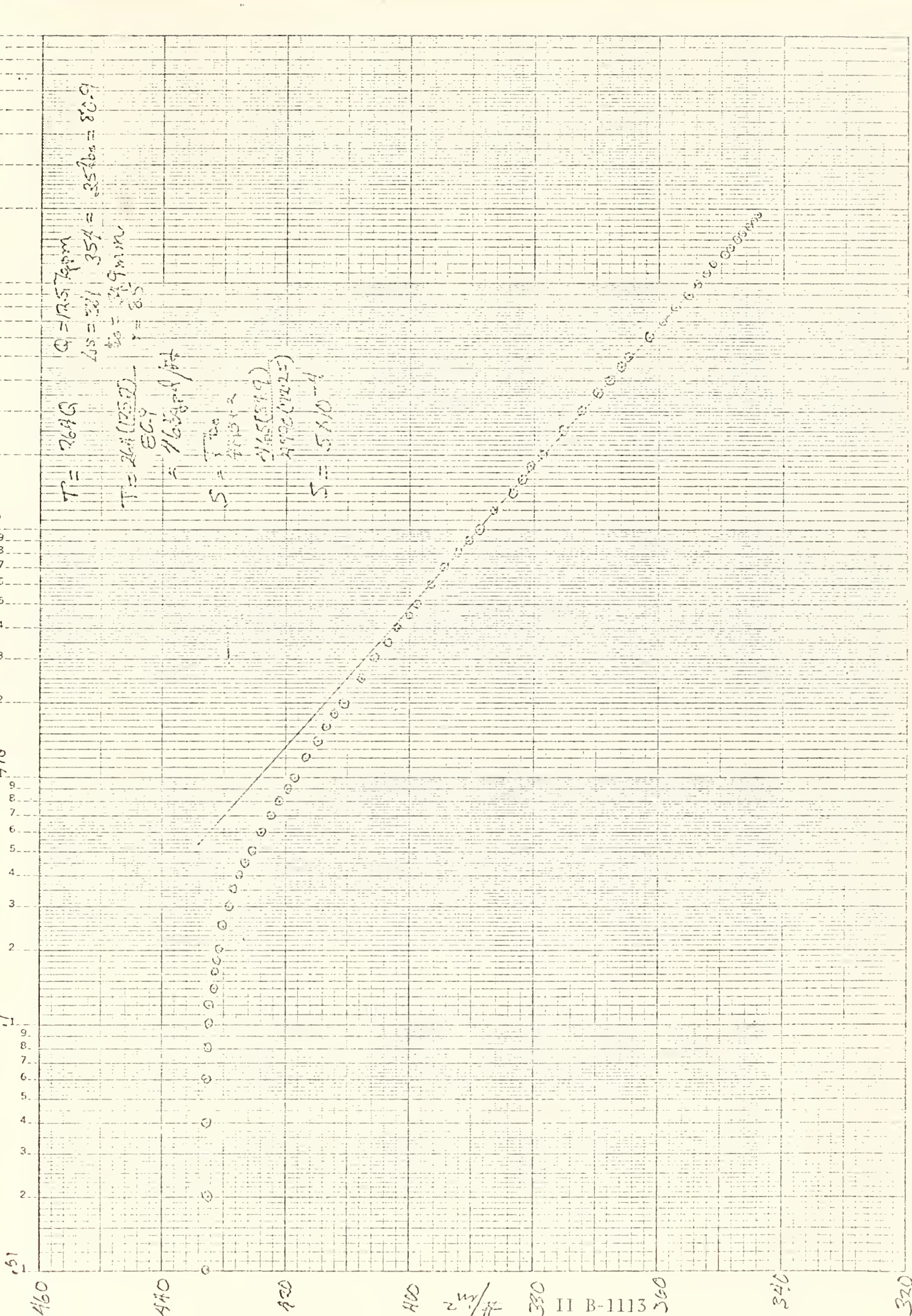


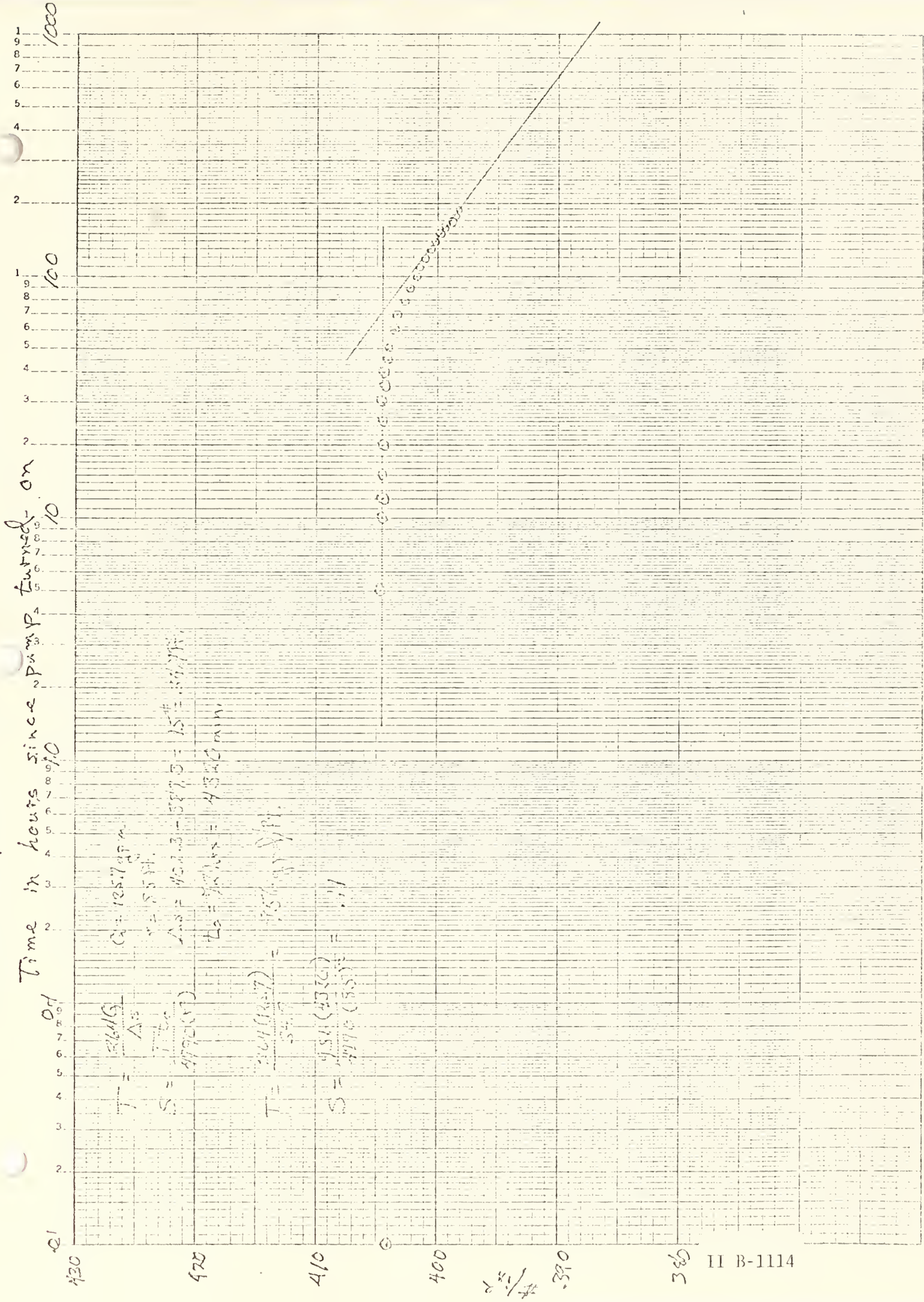
At #1 Pulse test Lower Aquifer - Drawdown

3-10-75

3-26-75

Time in hours since pump turned on



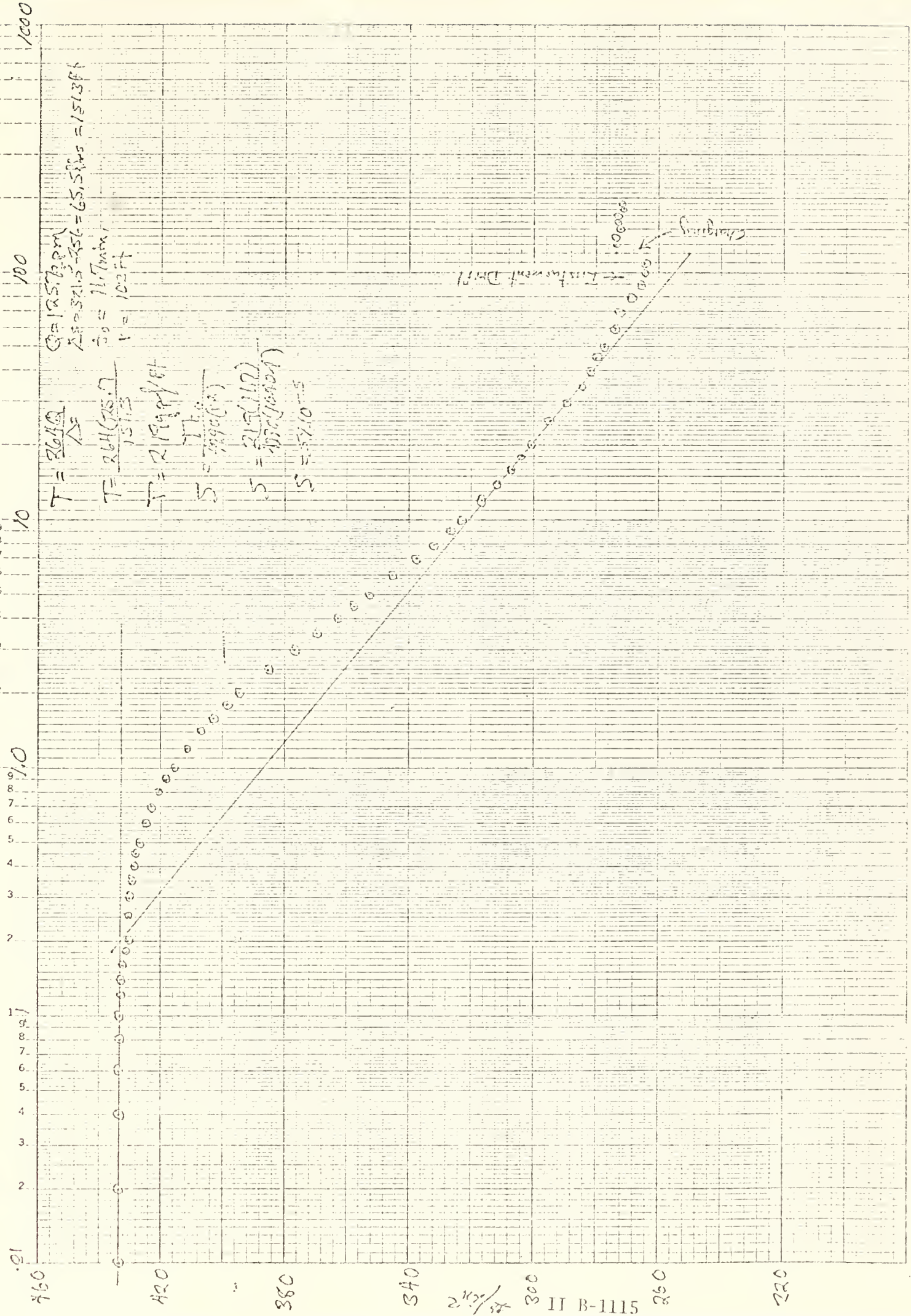


At -1A String #2 Pulsatest

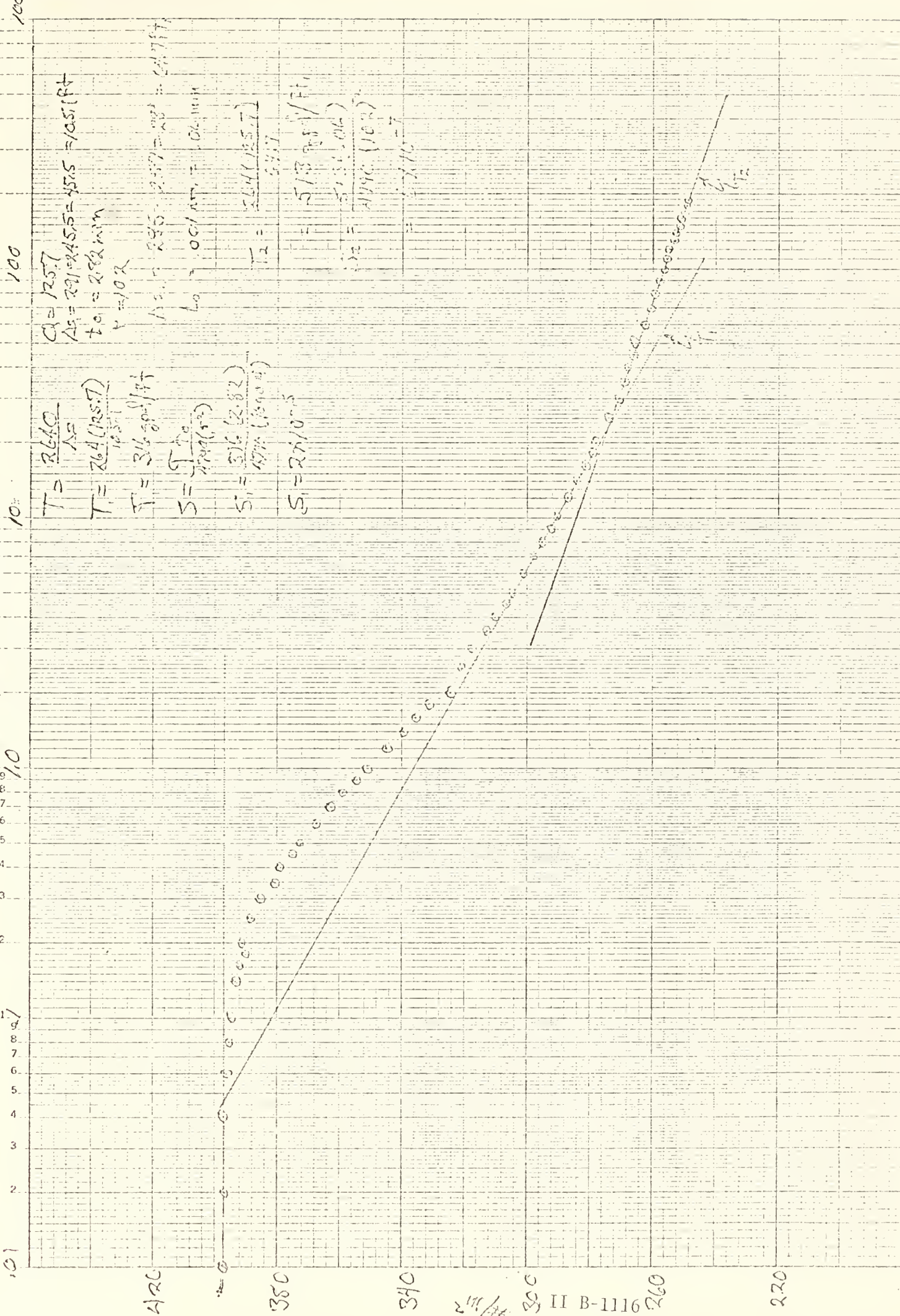
Lowell Aguirre - Drawdown

3-18-75 → 3-26-75

Time in hours since pump turned on

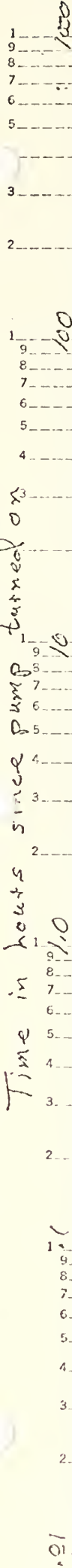


Time in hours since pump turned on



APIC String #2 Pulse Test Lower Aquifer - Drawdown 318-75 → 3-26-75

Time in hours since pump turned on



$$T = \frac{2640}{\Delta S}$$

$$S = 125.7 \text{ ft}$$

$$\Delta S = 500 - 247 = 253 \text{ ft}$$

$$T = 10.4 \text{ hr}$$

$$T = \frac{2640}{\Delta S}$$

$$S = 125.7 \text{ ft}$$

$$\Delta S = 500 - 247 = 253 \text{ ft}$$

$$T = 10.4 \text{ hr}$$

$$T = \frac{2640}{\Delta S}$$

$$S = 125.7 \text{ ft}$$

$$\Delta S = 500 - 247 = 253 \text{ ft}$$

$$T = 10.4 \text{ hr}$$

$$T = \frac{2640}{\Delta S}$$

$$S = 125.7 \text{ ft}$$

$$\Delta S = 500 - 247 = 253 \text{ ft}$$

$$T = 10.4 \text{ hr}$$

$$T = \frac{2640}{\Delta S}$$

$$S = 125.7 \text{ ft}$$

$$\Delta S = 500 - 247 = 253 \text{ ft}$$

$$T = 10.4 \text{ hr}$$

$$\Delta S = 291.5 - 247 = 44.5 \text{ ft}$$

$$T = 5.94 \text{ hr}$$

$$T = \frac{2640}{\Delta S}$$

$$S = 125.7 \text{ ft}$$

$$\Delta S = 500 - 247 = 253 \text{ ft}$$

$$T = 10.4 \text{ hr}$$

$$T = \frac{2640}{\Delta S}$$

$$S = 125.7 \text{ ft}$$

$$\Delta S = 500 - 247 = 253 \text{ ft}$$

$$T = 10.4 \text{ hr}$$

$$T = \frac{2640}{\Delta S}$$

$$S = 125.7 \text{ ft}$$

$$\Delta S = 500 - 247 = 253 \text{ ft}$$

$$T = 10.4 \text{ hr}$$

$$T = \frac{2640}{\Delta S}$$

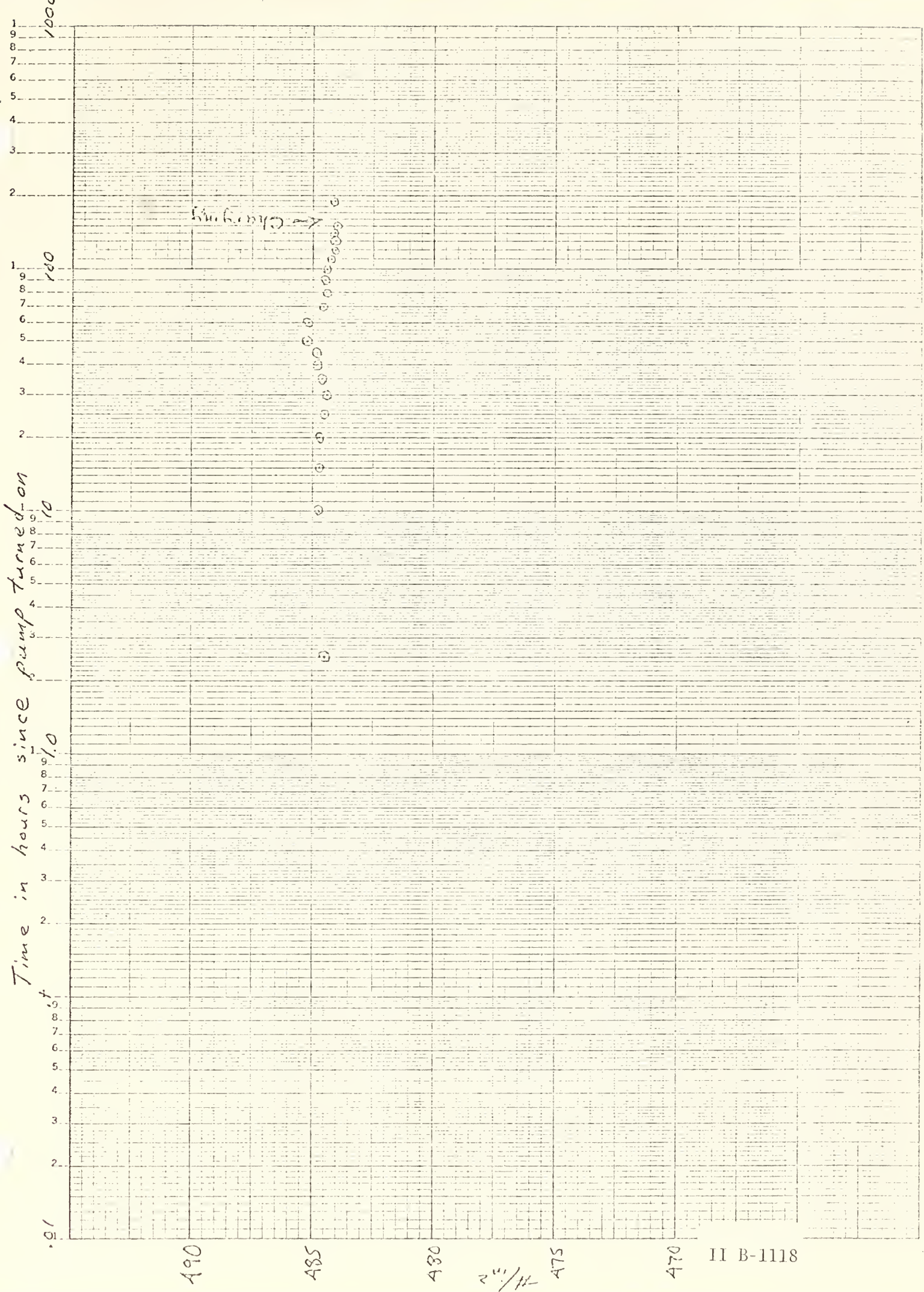
$$S = 125.7 \text{ ft}$$

$$\Delta S = 500 - 247 = 253 \text{ ft}$$

$$T = 10.4 \text{ hr}$$

Charged

Time in hours since pump turned on



Pulse Test Lower Aquifer SG-6 #1 String Drawdown Test 3-18-75 3-26-75

Time in hours since pump turned on

430

$$T = \frac{2649}{\Delta s}$$

$$S = \frac{T^2}{4900 (F)}$$

$$G = 1257$$

$$F = 1257$$

$$\Delta s = 1257 - 300.2 = 956.8$$

$$T = 2.21 \text{ hours} = 1362 \text{ min}$$

$$T = \frac{264.1257}{7511} = 442.9 \text{ min/hr}$$

$$S = \frac{442.136}{4770 (1257)} = 8 \times 10^{-5}$$

410

400

2 1/2 / #

390

II B-1119

380

370



Time in hours since pump turned on

10.

450

44
2330
11
1

$$Q = 125.7 \text{ gpa}$$

$$\frac{SV}{T} = 1$$

47002

$$\Delta S_1 = 131.6 - 421.8 = -290.2 \text{ J/K}$$

$$t_0 = 46 \text{ hrs} = 2.760 \text{ min.}$$

$$\Delta S = 44.7 - 47.7 = -3.0 \text{ cal.}$$

Let $\mathcal{W} = \mathcal{W}_1 \cup \mathcal{W}_2$

$$T_1 = \frac{26.4 \cdot 12.57}{22.6} = 146.89 \text{ g/ft.}$$

$$S_1 = \frac{146.8 \cdot 2760}{4780 (255)^2} = 15 \times 10^{-4}$$

[illegible]

$$51 - \frac{51 \cdot 4790}{4790(357)} = 13 \times 10^{-4}$$

$$x^2 / 112$$

○

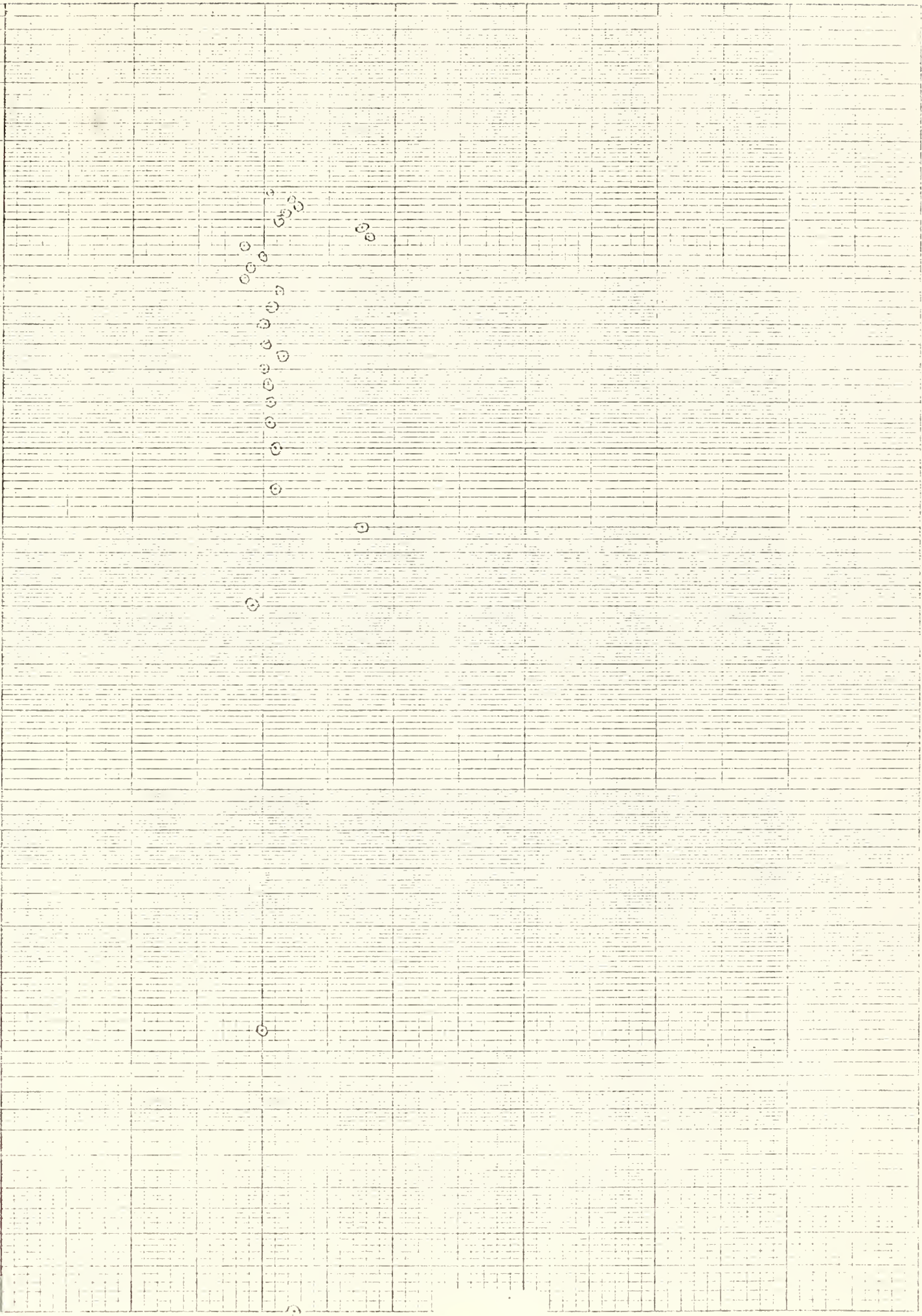
II B-1120

$$\frac{O}{N}$$

Pulse Test 56-10 String #1 Drawdown Test 3-10 -75 — Lower Aquifer 3-26-75

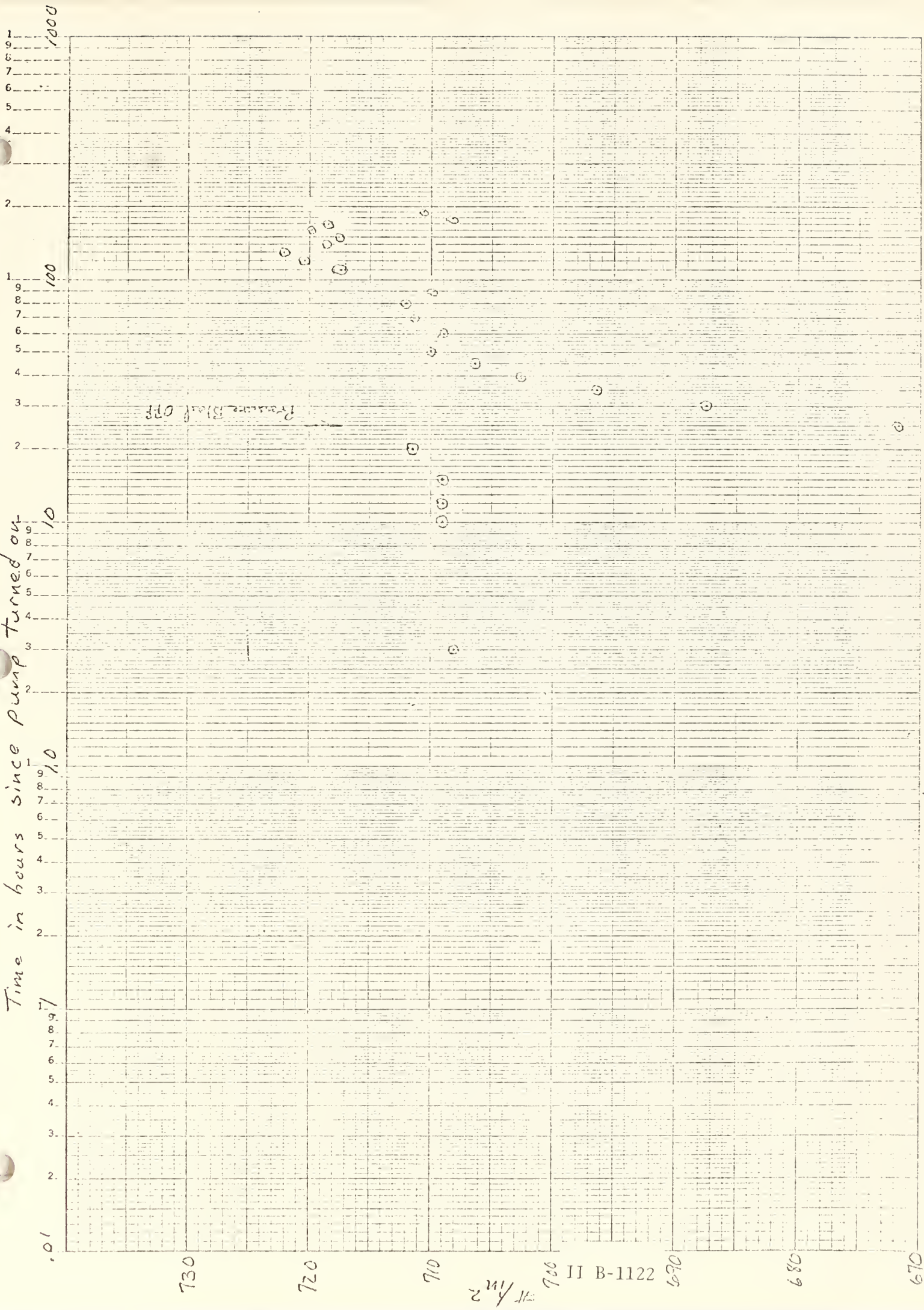
Time in hours since pump turned on

1000
100
10
1.0
0.1



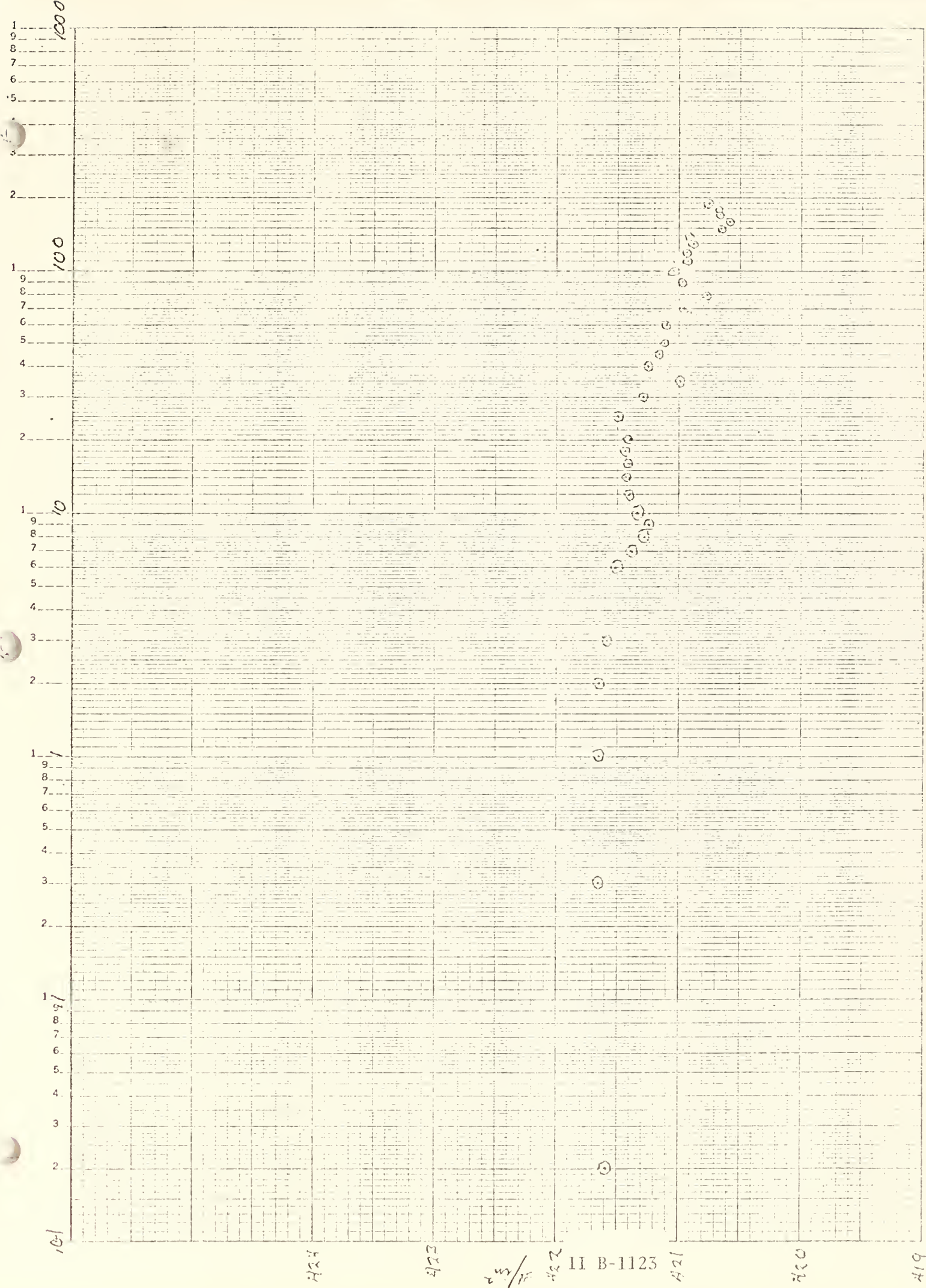
Pulse Test 56-10 string #2 Drawdown 3-18-75 — Lower Aquifer 3-26-75

Time in hours since pump turned on



670

Pulse Test Lower Agüirre SG-11 String #1 Drawdown Test 3-18-75 — 3-26-75



Pulse Test Lower Aquifer SG-11 #2 String & Drawdown test 3-18-75 → 3-26-75

LOWER AQUIFER PUMP TEST

FINAL RECOVERY CURVES

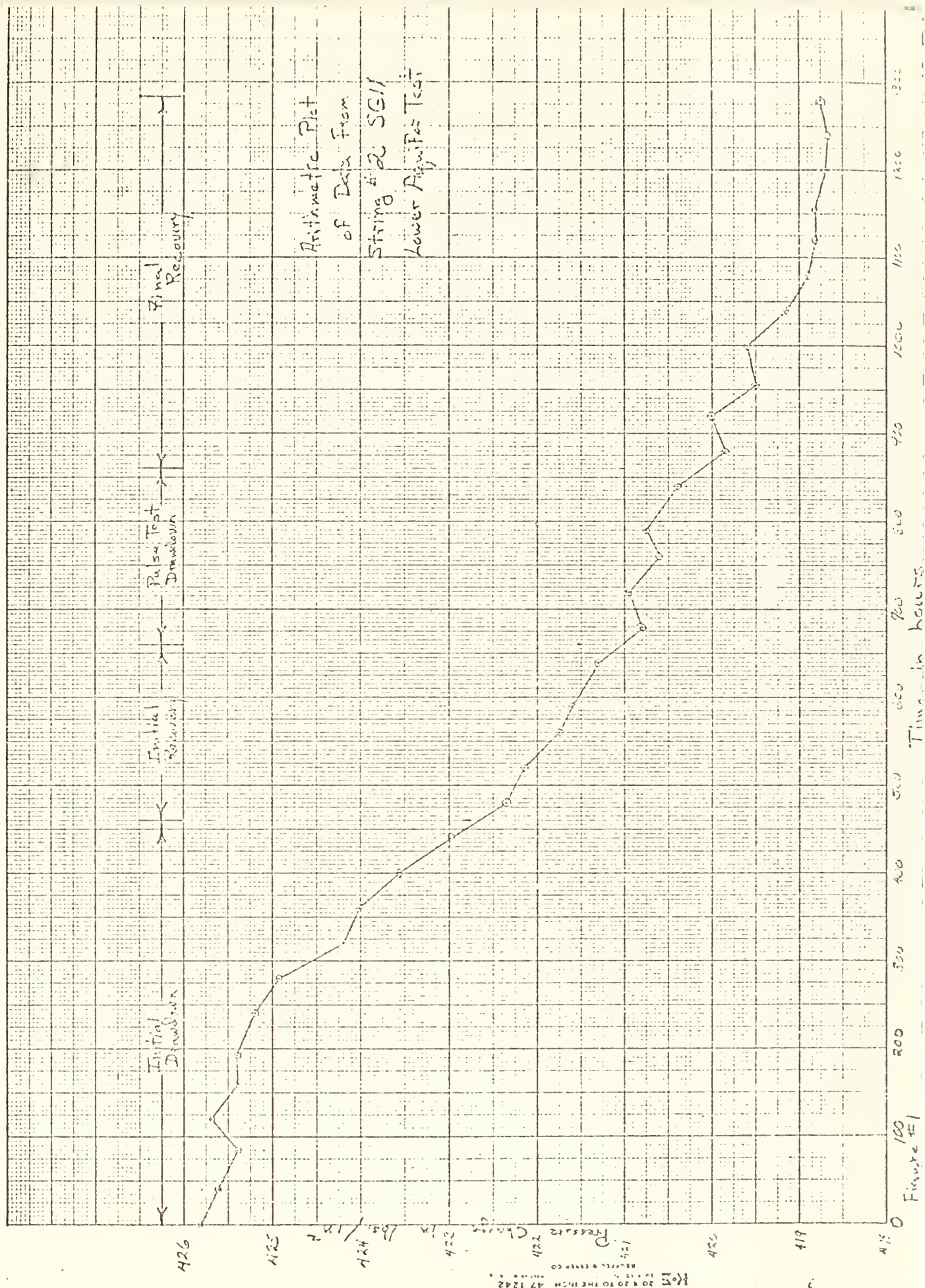
TABLE II B-54
TRANSMISSIVITY and STORAGE COEFFICIENT VALUES

Lower Aquifer Pump Test

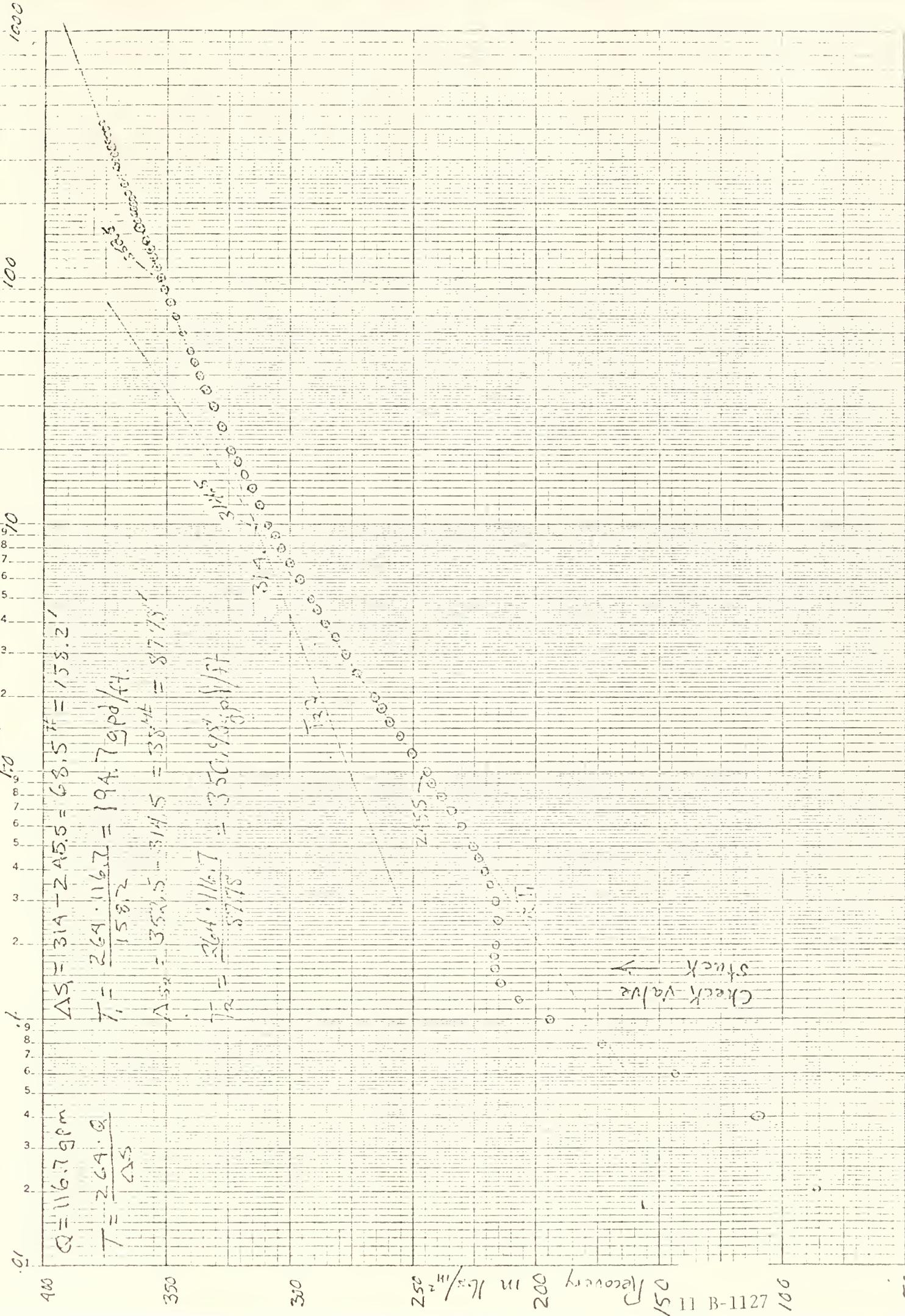
Well No.	Final Recovery
AT#1	T = 194.7 gpd/ft. Initial T = 351.0 gpd/ft. Final
AT#1A (String #1)	T = 333.4 gpd/ft.; S = 6.4×10^{-4} Initial T = 365.4 gpd/ft.; S = 5.3×10^{-4} Final
(String #2)	NO VALID RESPONSE
AT#1C (String #1)	T = 133.4 gpd/ft.; S = 1.8×10^{-4} Initial T = 310.3 gpd/ft.; S = 1.5×10^{-5} Final
(String #2)	T = 226 gpd/ft.; S = 5.2×10^{-5} Initial T = 346.9 gpd/ft.; S = 1.4×10^{-5} Final
AT#1D (String #1)	T = 303.2 gpd/ft.; S = 2.5×10^{-5} Initial T = 360.5 gpd/ft.; S = 1.1×10^{-5} Final
SG-6 (String #1)	T = 380.8 gpd/ft.; S = 1.02×10^{-3}
(String #2)	T = 400.5 gpd/ft.; S = 8×10^{-5}
SG-10 (String #1)	T = 694.6 gpd/ft.; S = 1.4×10^{-5}
(String #2)	NO RESPONSE
SG-11 (String #1)	NO USABLE RESPONSE DUE TO HIGH GAS PRESSURE POSSIBLE
(String #2)	NO USABLE RESPONSE DUE TO <u>TO</u> /INSTRUMENT DRIFT

THE UNIVERSITY OF CHICAGO DEPARTMENT OF CHEMISTRY RECORD OF RESEARCH

NAME OF RESEARCHER	DATE
J. H. VAN VLEET	1954
J. H. VAN VLEET	1955
J. H. VAN VLEET	1956
J. H. VAN VLEET	1957
J. H. VAN VLEET	1958
J. H. VAN VLEET	1959
J. H. VAN VLEET	1960
J. H. VAN VLEET	1961
J. H. VAN VLEET	1962
J. H. VAN VLEET	1963
J. H. VAN VLEET	1964
J. H. VAN VLEET	1965
J. H. VAN VLEET	1966
J. H. VAN VLEET	1967
J. H. VAN VLEET	1968
J. H. VAN VLEET	1969
J. H. VAN VLEET	1970
J. H. VAN VLEET	1971
J. H. VAN VLEET	1972
J. H. VAN VLEET	1973
J. H. VAN VLEET	1974



Time in hours since pump turned off



Time in hours since pump turned off.

0.1

460

$$r = 85 \text{ ft.}$$

$$Q = 116.7 \text{ gpm}$$

$$T = \frac{264 Q}{AS}$$

$$S = \frac{T - t_0}{A190 r^2}$$

$$\Delta S_1 = 382 - 342 = 40' = 92.4'$$

$$t_0 = 66 \text{ min.}$$

$$T_1 = \frac{264 \cdot 116.7}{92.4} = 333.4 \text{ gpd/ft.}$$

$$S_1 = \frac{333.4 \cdot 66}{4790 \cdot (85)^2} = 6.4 \times 10^{-4}$$

$$AS_1 = 419.5 \cdot 10^{-4} = 36.5' = 84.3 \text{ ft.} \quad t_{02} = 51 \text{ min.}$$

$$T_2 = \frac{264 \cdot 116.7}{84.3} = 365.7 \text{ gpd/ft.}$$

$$S_2 = \frac{365.7 \cdot 51}{4790 \cdot (85)^2} = 5.5 \times 10^{-4}$$

420

400

380

360

340

320

300

280

260

240

220

200

180

160

140

120

100

80

60

40

20

0

100

100

100

100

100

100

100

100

100

100

At 10 #/40... 1... 4-15-7.

TIME IN HOURS SINCE PUMP TURNED OFF

0.1

1

10

100

10

100

100

100

1000

430

$C_1 = 116.7 \text{ ppm}$

$F = 85 \text{ FT}$

$\Delta S = 31.5 \text{ ft} = 119.7 \text{ ft}$

$L_0 = 672 \text{ ft}$

$$T = \frac{2646}{\Delta S}$$

$$S = \frac{160}{4790(5)}$$

$$T = \frac{264116.7}{4797} = 6199 \text{ sec} = 1.72 \text{ hr}$$

$$S = \frac{610.9 \cdot 6720}{4790(3.5)} = 1.2$$

410 II B-1129

400

390

380

370

360

400

390

380

370

360

400

390

380

370

360

400

390

380

370

360

400

390

380

370

360

400

390

380

370

360

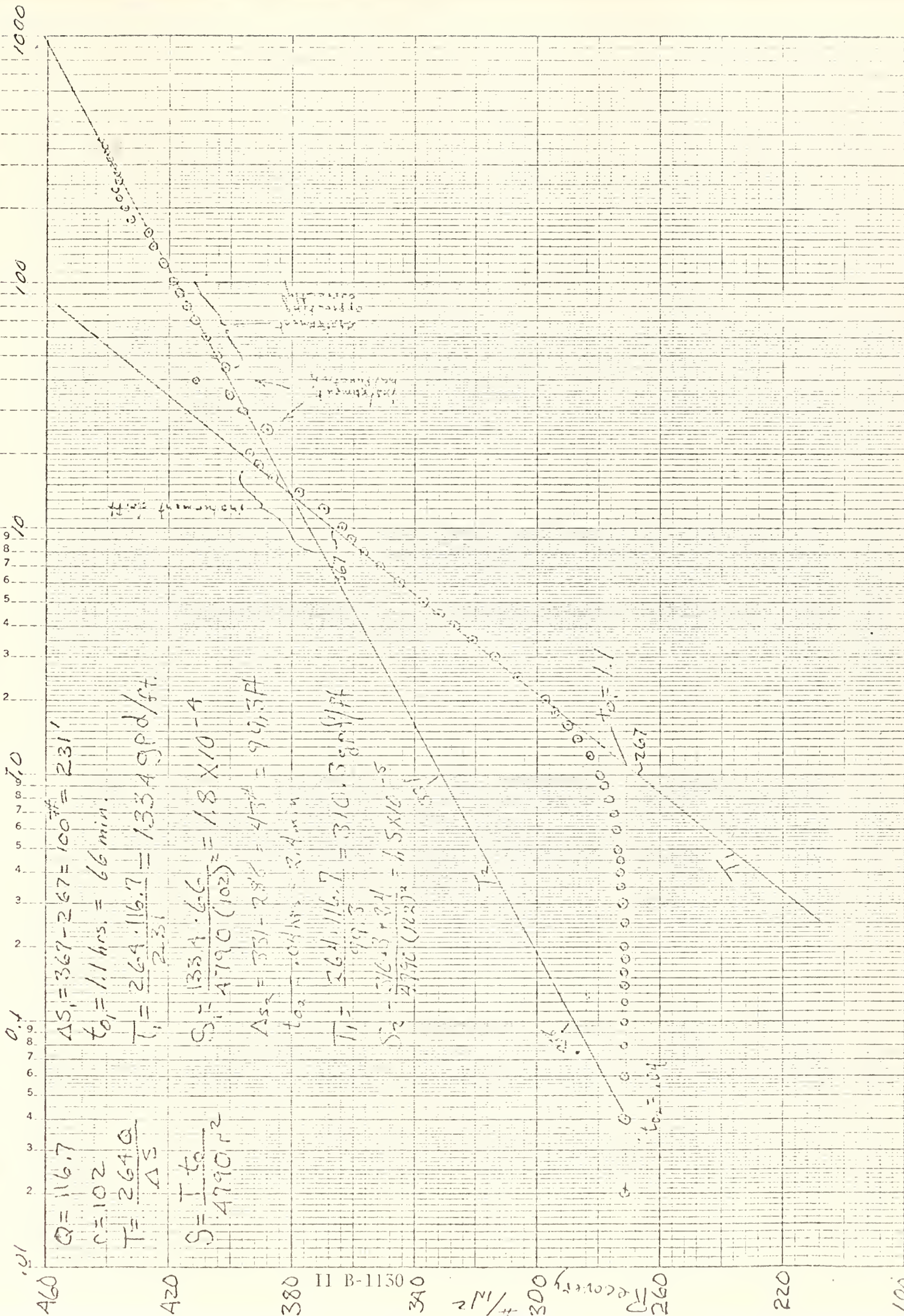
AT IN #10.11

END OF RECORD

2-21-75

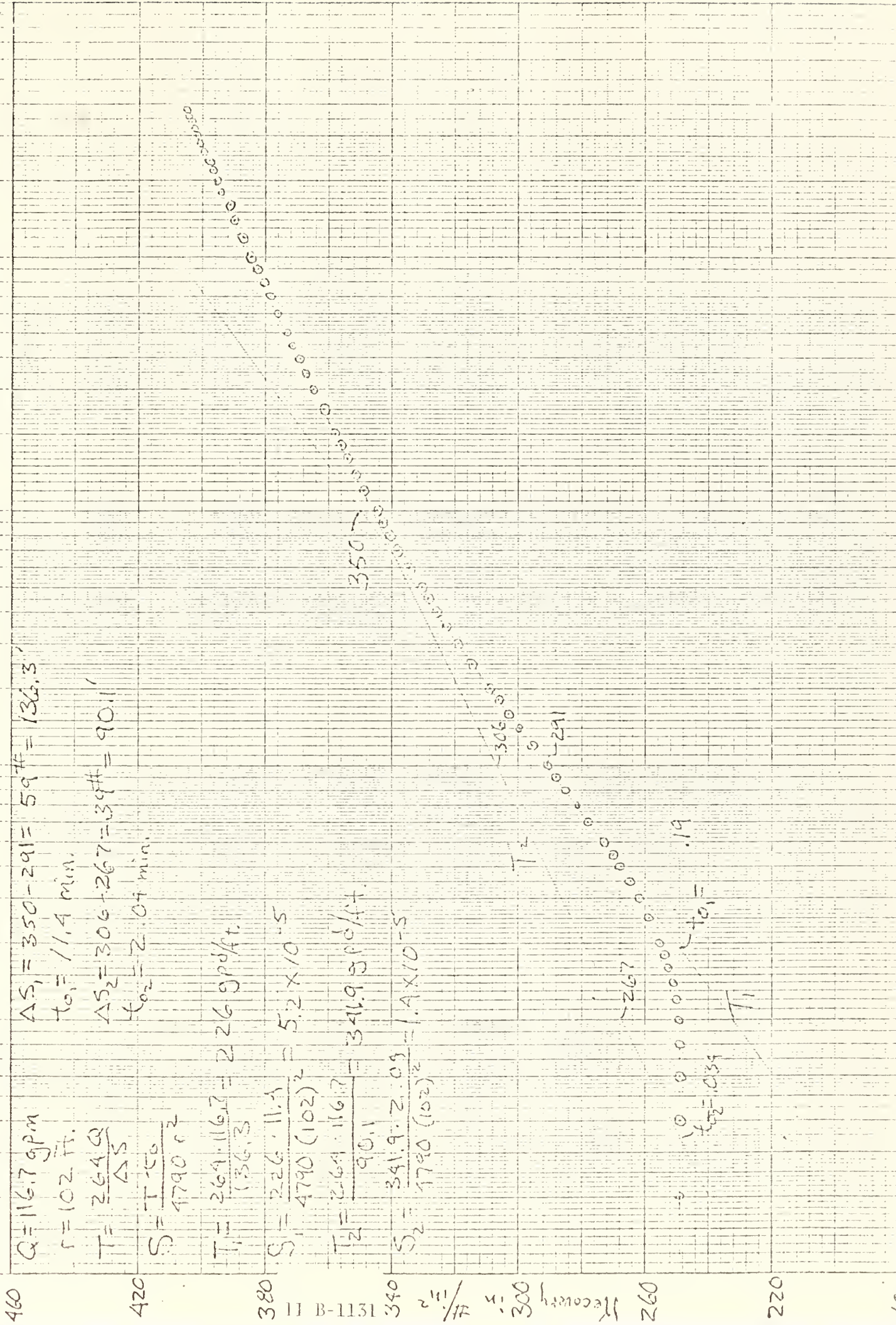
8-15-75

TIME IN HOURS SINCE PUMP TURNED OFF



TIME IN HOURS SINCE PUMP TURNED OFF

100 1000



TIME IN HOURS SINCE PUMP TURNED OFF

495

0.1

1.0

10

100

1000

$$T = \frac{264.6}{1.15}$$

$$T = \frac{264.116.7}{8.64} = 3808 \text{ gal/ft}$$

$$S = \frac{T t_0}{4790 (S)^2}$$

$$S = \frac{3808 \cdot 2130}{4790 (1200)^2}$$

$$C_1 = 116.7 \text{ gpm}$$

$$T = 1254 \text{ ft}$$

$$A_0 = 3.5 = 807 \text{ ft}$$

$$t_0 = 35.5 \text{ hrs} = 2130 \text{ min}$$

485

B-1133

480

Recovery #1

475

Recovery

470

465

460

SC #1 STRING #1

EMPIRICAL

1.1160

2.2175

3.3175

4.4175

5.5175

6.6175

7.7175

8.8175

9.9175

10.0175

11.1175

12.2175

13.3175

14.4175

15.5175

16.6175

17.7175

18.8175

19.9175

20.0175

21.1175

22.2175

23.3175

24.4175

25.5175

26.6175

27.7175

28.8175

29.9175

30.0175

31.1175

32.2175

33.3175

34.4175

35.5175

36.6175

37.7175

38.8175

39.9175

40.0175

41.1175

42.2175

43.3175

44.4175

45.5175

46.6175

47.7175

48.8175

49.9175

50.0175

51.1175

52.2175

53.3175

54.4175

55.5175

56.6175

57.7175

58.8175

59.9175

60.0175

61.1175

62.2175

63.3175

64.4175

65.5175

66.6175

67.7175

68.8175

69.9175

70.0175

71.1175

72.2175

73.3175

74.4175

75.5175

76.6175

77.7175

78.8175

79.9175

80.0175

81.1175

82.2175

83.3175

84.4175

85.5175

86.6175

87.7175

88.8175

89.9175

90.0175

91.1175

92.2175

93.3175

94.4175

95.5175

96.6175

97.7175

98.8175

99.9175

100.0175

101.1175

102.2175

103.3175

104.4175

105.5175

106.6175

107.7175

108.8175

109.9175

110.0175

111.1175

112.2175

113.3175

114.4175

115.5175

116.6175

117.7175

118.8175

119.9175

120.0175

121.1175

122.2175

123.3175

124.4175

125.5175

126.6175

127.7175

128.8175

129.9175

130.0175

131.1175

132.2175

133.3175

134.4175

135.5175

136.6175

137.7175

138.8175

139.9175

140.0175

141.1175

142.2175

143.3175

144.4175

145.5175

146.6175

147.7175

148.8175

149.9175

150.0175

151.1175

152.2175

153.3175

154.4175

155.5175

156.6175

157.7175

158.8175

159.9175

160.0175

161.1175

162.2175

163.3175

164.4175

165.5175

166.6175

167.7175

168.8175

169.9175

170.0175

171.1175

172.2175

173.3175

174.4175

175.5175

176.6175

177.7175

178.8175

179.9175

180.0175

181.1175

182.2175

183.3175

184.4175

185.5175

186.6175

187.7175

188.8175

189.9175

190.0175

191.1175

192.2175

193.3175

194.4175

195.5175

196.6175

197.7175

198.8175

199.9175

200.0175

201.1175

202.2175

203.3175

204.4175

205.5175

206.6175

207.7175

208.8175

209.9175

210.0175

211.1175

212.2175

213.3175

214.4175

215.5175

216.6175

217.7175

218.8175

219.9175

220.0175

221.1175

222.2175

223.3175

224.4175

225.5175

226.6175

227.7175

228.8175

229.9175

230.0175

231.1175

232.2175

233.3175

234.4175

235.5175

236.6175

237.7175

238.8175

239.9175

240.0175

241.1175

242.2175

243.3175

244.4175

245.5175

246.6175

247.7175

248.8175

249.9175

250.0175

251.1175

252.2175

253.3175

254.4175

255.5175

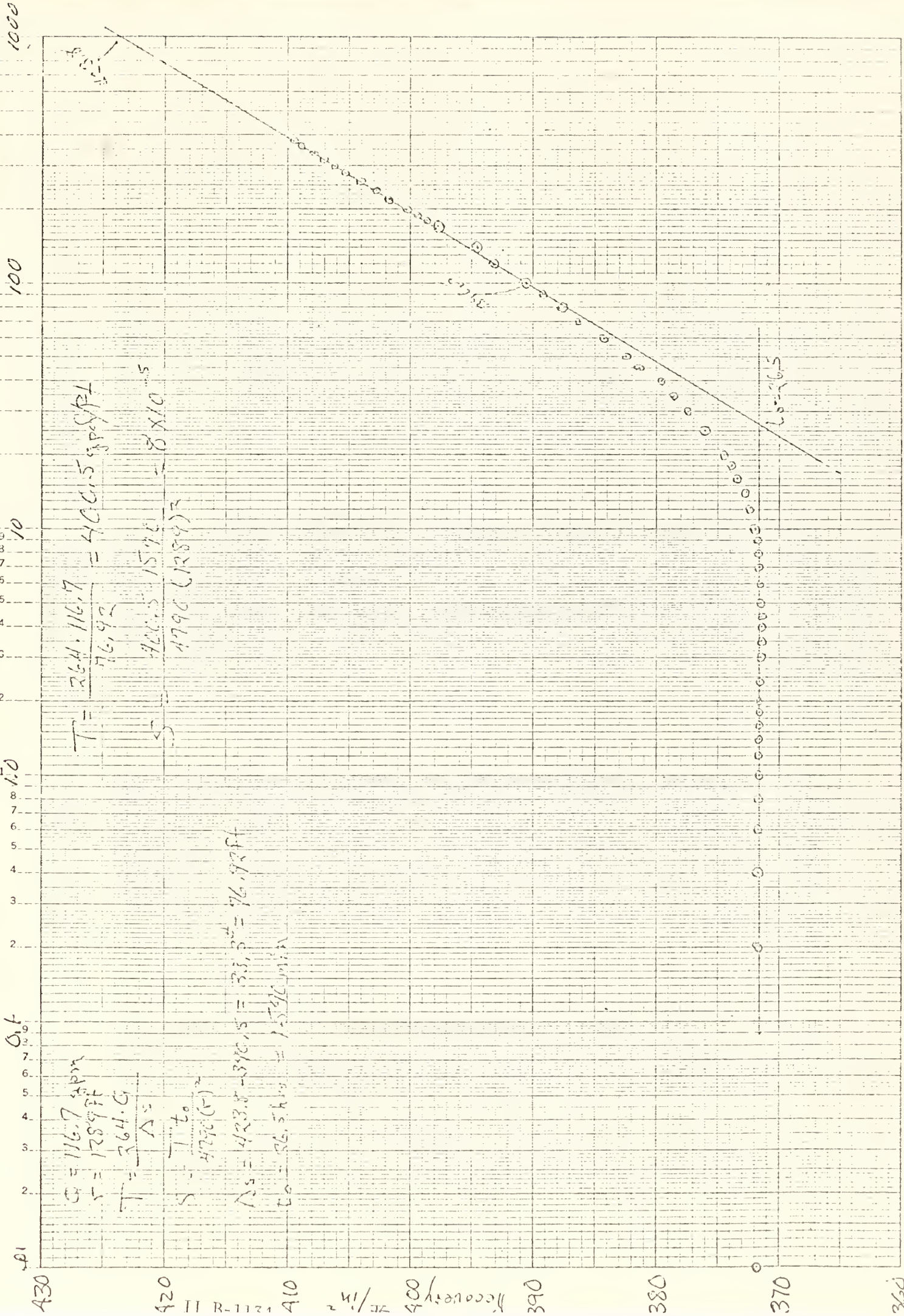
256.6175

257.7175

258.8175

259.91

TIME IN HOURS SINCE PUMP TURNED OFF



$$Q = 116.7 \text{ gpm}$$

$$r = 1289 \text{ ft}$$

$$T = \frac{264.6}{\Delta s}$$

$$S = \frac{T \cdot t_0}{4790(r')^2}$$

$$\Delta s = 423.8 - 340.5 = 83.3 \text{ ft} = 76.12 \text{ ft}$$

$$t_0 = 26.5 \text{ hrs} = 1540 \text{ min}$$

$$T = \frac{264.6 \cdot 116.7}{76.12} = 406.5 \text{ gpm/ft}$$

$$S = \frac{406.5 \cdot 1540}{4790(1289)^2} = 8 \times 10^{-5}$$

$$4790(1289)^2$$

15.4

SC# 1 STINK #7 FINAL RECOVERY 1 HOUR ADVISED 3-1-72 15-72

TIME IN HOURS SINCE PUMP TURNED OFF

0.1 1 2 3 4 5 6 7 8 9 10

100 1000

$$T = \frac{364.16}{1.26} = 289.02$$

$$S = \frac{1.26}{4790(5)^2} = 1.4 \times 10^{-5}$$

$$C_0 = 116.7 \text{ gpm}$$

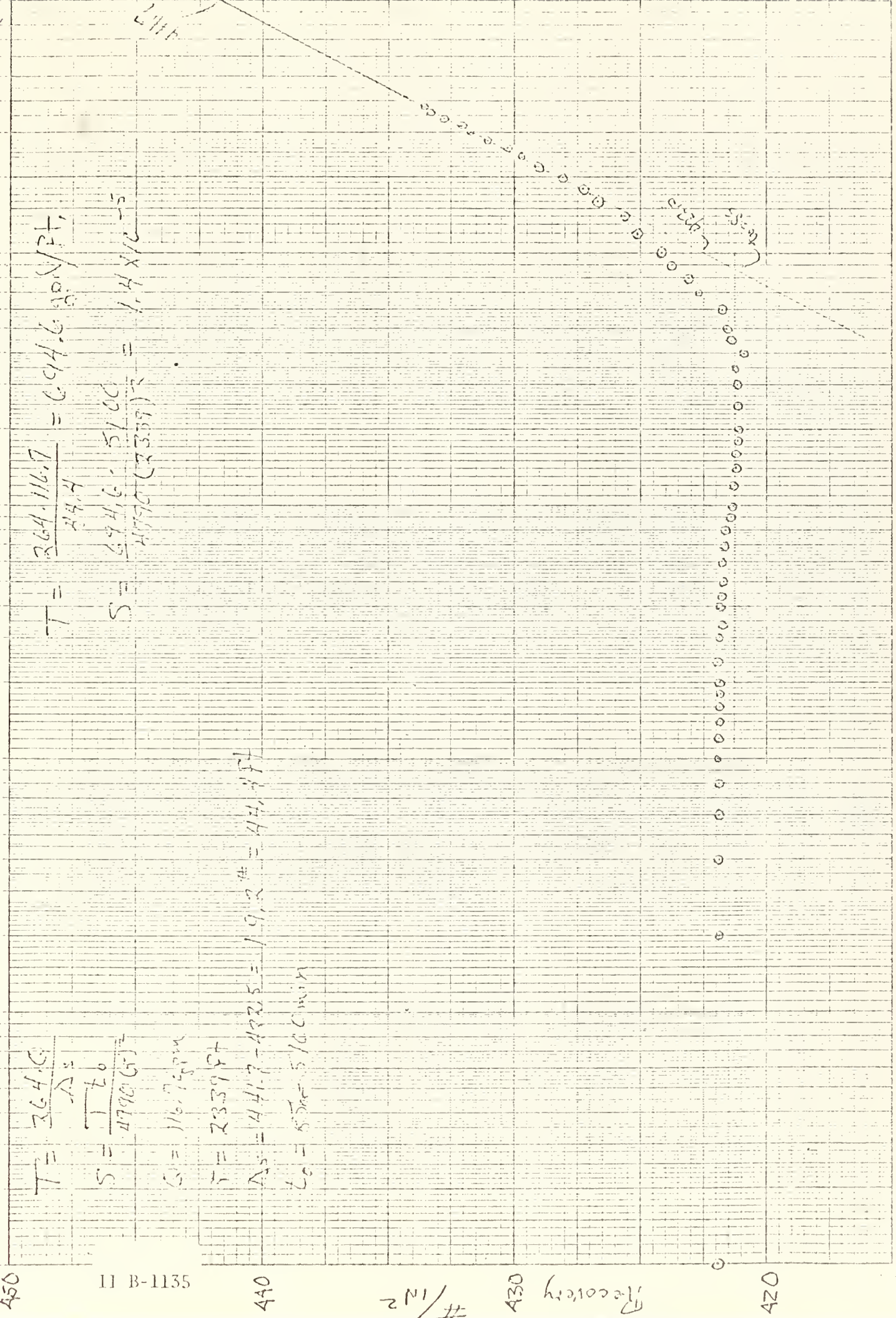
$$T = 2339 \text{ ft}$$

$$A_s = 441.7 - 422.5 = 19.2 \text{ ft} = 44.4 \text{ ft}$$

$$L_0 = 85 \text{ ft} = 5100 \text{ min}$$

$$T = \frac{364.116.7}{1.26} = 289.02$$

$$S = \frac{1.26}{4790(5)^2} = 1.4 \times 10^{-5}$$



RG#10 STRIP#1 FINAL RECOVERY LOWER AQUIFER 3-26-75 TO 4-15-75

46 6212

46 6212

TIME IN HOURS SINCE PUMP TURNED OFF

650

0.1

0.2

0.3

0.4

0.5

0.6

0.7

0.8

0.9

1.0

1.1

0.2

0.3

0.4

0.5

0.6

0.7

0.8

0.9

1.0

1.1

1.2

1.3

0.4

0.5

0.6

0.7

0.8

0.9

0.5

0.6

0.7

0.8

0.9

1.0

0.6

0.7

0.8

0.9

1.0

1.1

0.7

0.8

0.9

1.0

1.1

1.2

0.8

0.9

1.0

1.1

1.2

1.3

0.9

1.0

1.1

1.2

1.3

1.4

1.0

1.1

1.2

1.3

1.4

1.5

1.1

1.2

1.3

1.4

1.5

1.6

1.2

1.3

1.4

1.5

1.6

1.7

1.3

1.4

1.5

1.6

1.7

1.8

1.4

1.5

1.6

1.7

1.8

1.9

1.5

1.6

1.7

1.8

1.9

2.0

1.6

1.7

1.8

1.9

2.0

2.1

1.7

1.8

1.9

2.0

2.1

2.2

1.8

1.9

2.0

2.1

2.2

2.3

1.9

2.0

2.1

2.2

2.3

2.4

2.0

2.1

2.2

2.3

2.4

2.5

2.1

2.2

2.3

2.4

2.5

2.6

2.2

2.3

2.4

2.5

2.6

2.7

2.3

2.4

2.5

2.6

2.7

2.8

2.4

2.5

2.6

2.7

2.8

2.9

2.5

2.6

2.7

2.8

2.9

3.0

2.6

2.7

2.8

2.9

3.0

3.1

2.7

2.8

2.9

3.0

3.1

3.2

2.8

2.9

3.0

3.1

3.2

3.3

2.9

3.0

3.1

3.2

3.3

3.4

3.0

3.1

3.2

3.3

3.4

3.5

3.1

3.2

3.3

3.4

3.5

3.6

3.2

3.3

3.4

3.5

3.6

3.7

3.3

3.4

3.5

3.6

3.7

3.8

3.4

3.5

3.6

3.7

3.8

3.9

3.5

3.6

3.7

3.8

3.9

4.0

TIME IN HOURS SINCE PUMP TURNED OFF

0.1

2

3

4

5

6

7

8

9

1

2

3

4

5

6

7

8

9

10

100

1000

10000

100000

1000000

10000000

100000000

1000000000

10000000000

100000000000

1000000000000

10000000000000

100000000000000

1000000000000000

10000000000000000

100000000000000000

1000000000000000000

10000000000000000000

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100000000000000000000000

1000000000000000000000000

10000000000000000000000000

100000000000000000000000000

1000000000000000000000000000

10000000000000000000000000000

100000000000000000000000000000

1000000000000000000000000000000

10000000000000000000000000000000

740

730

B-1137

720

710

#/in²

700

Recovery

690

680

670

High pressure

Block of PPs

Instrument malfunction

CD # 11 <TD IN C # 1

FINAL DECOMPRESSION

1 MILLER APPROX 7-21-75

TA

4-15-77

TIME IN HOURS SINCE PUMP TURNED OFF

0.1

1

2

3

4

5

6

7

8

9

10

100

10

1

2

3

4

5

6

7

8

9

10

426

425

424

II B-1138

423

422

421

420

419

Instrument drift

SC-#11 STRING#2

FINAL RECOVERU

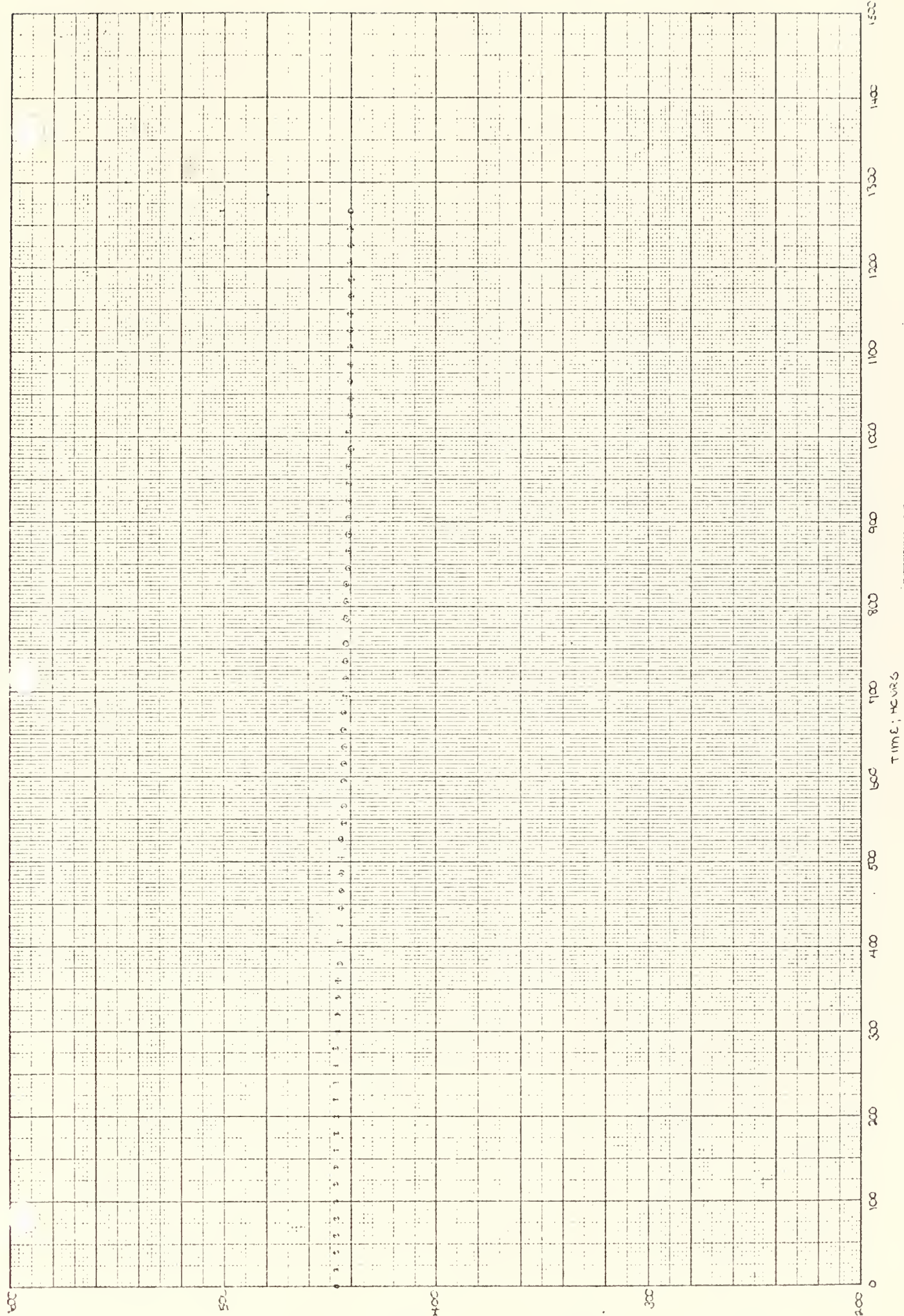
10000

2-20-75

TO 4-15-75

LOWER AQUIFER PUMP TEST
CORRECTED PRESSURE CURVES

LOWER AQUICL PUMP TEST : 26-11 STARTED AT 2

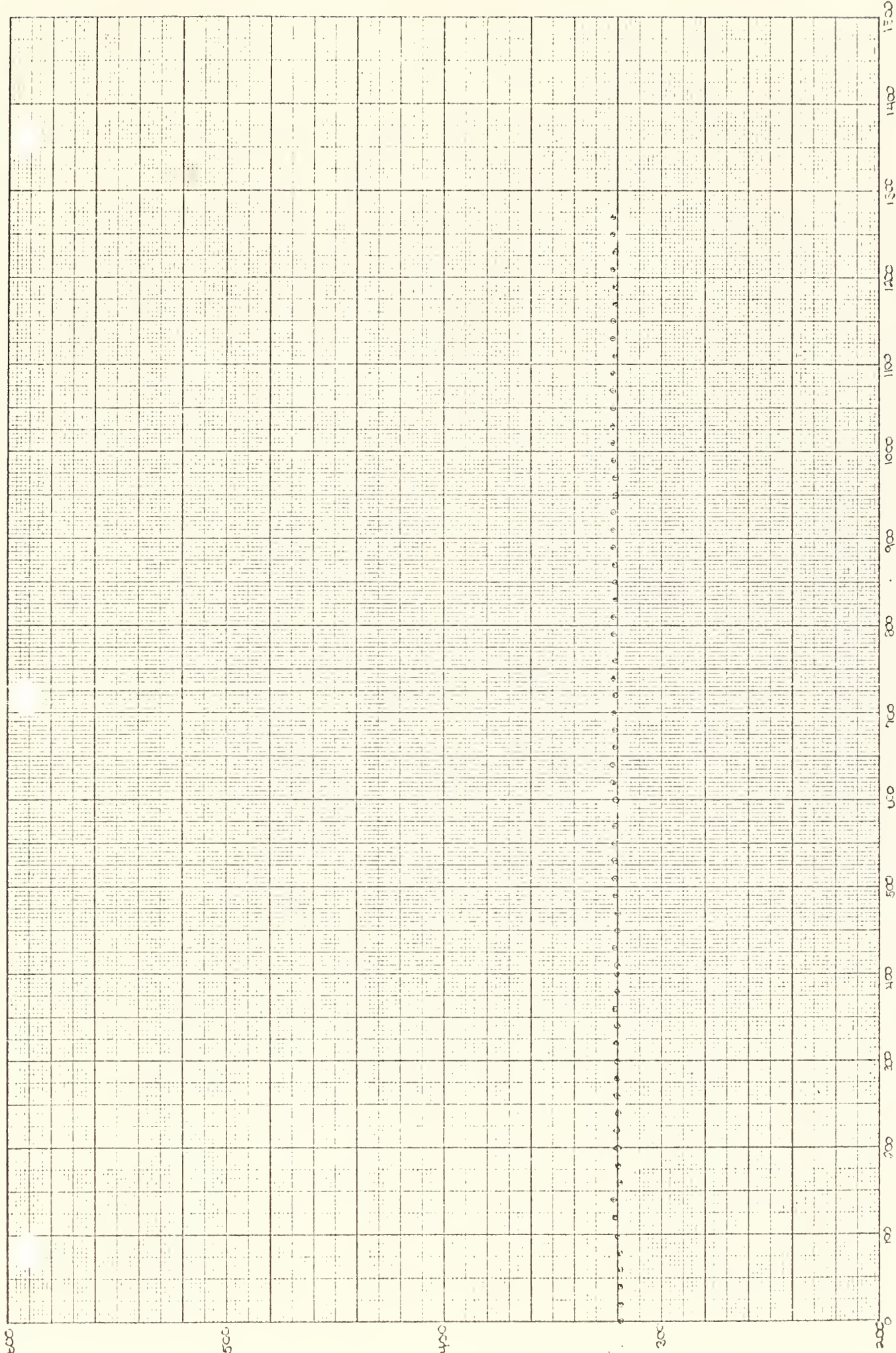


Pressure in PSI - corrected

K-2: 20 X 30 TO THE INCH 47 1242
RESISTANCE TEST CO.

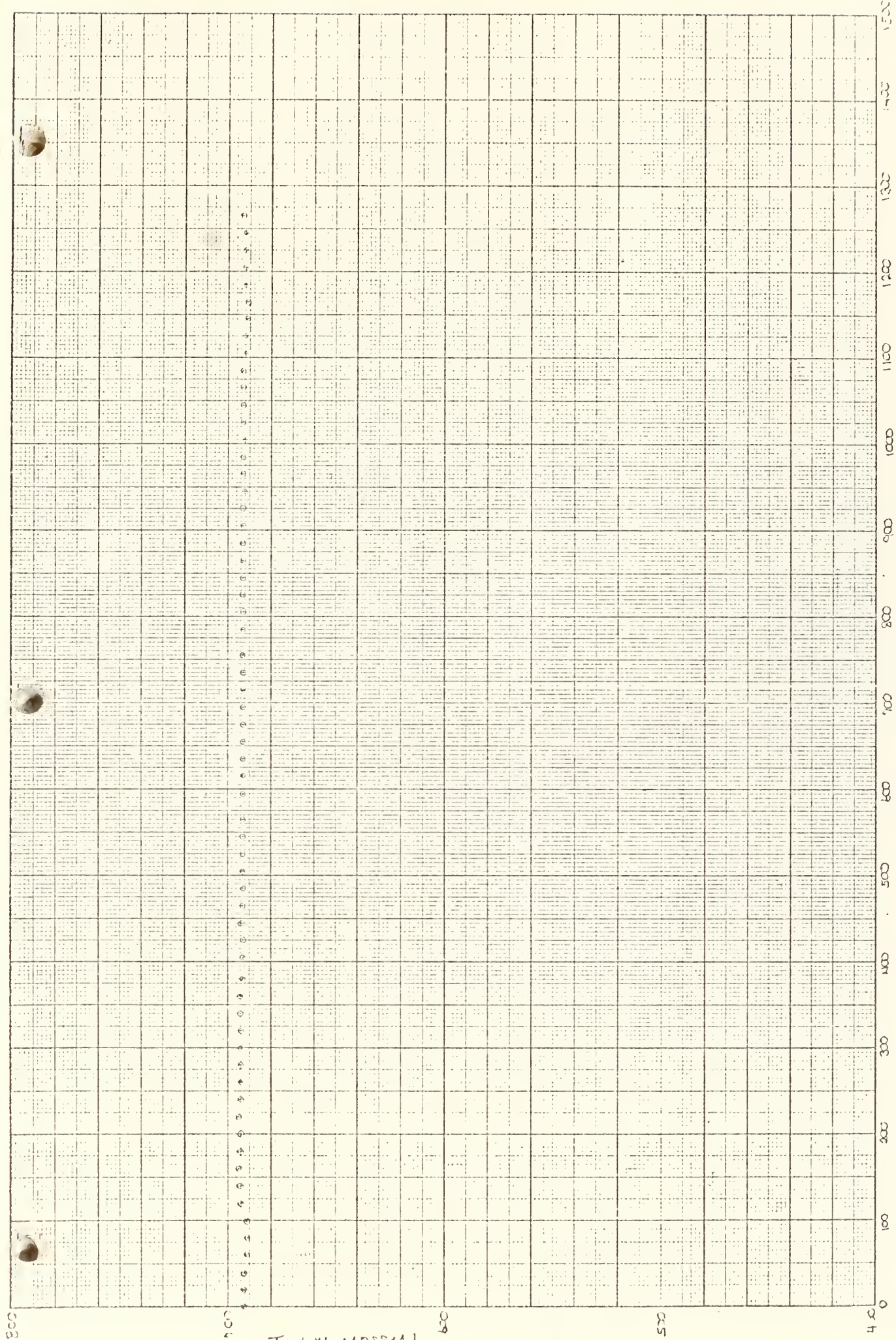
II B-1141

Pressure in PSI - Corrected



Time, Hours

LOWER AQUIFER PUMP TEST: SW-10 STATION #2



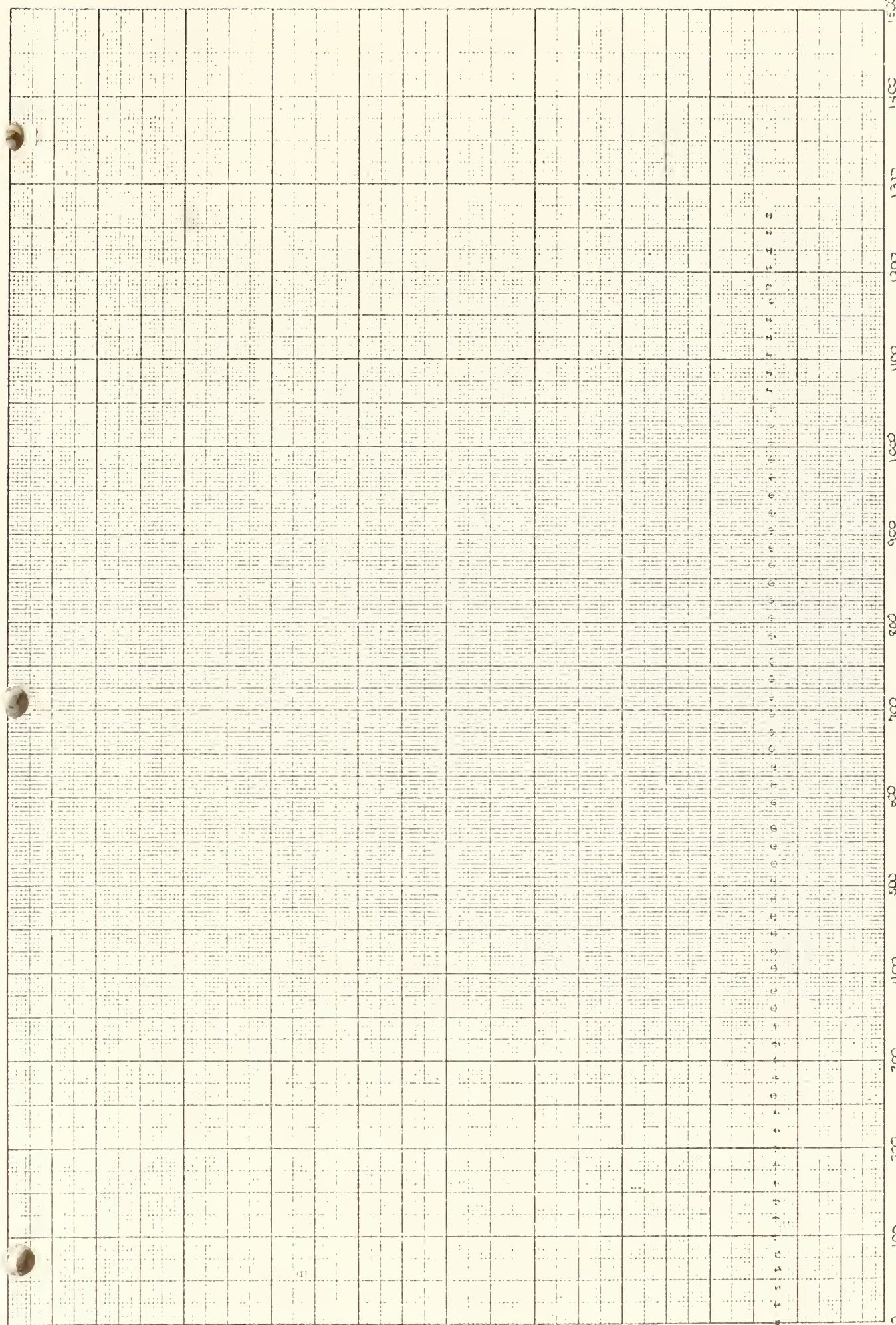
STATION TIME

Pressure in PSI-Corrected

1000
900
800
700
600
500
400
300
200
100
0

11 B-1144

3 # 3185 01-49-10 TEST: 5000 2500 1500 1000 500 0



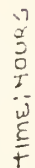
TIME, HOURS

Pressure in PSI - corrected

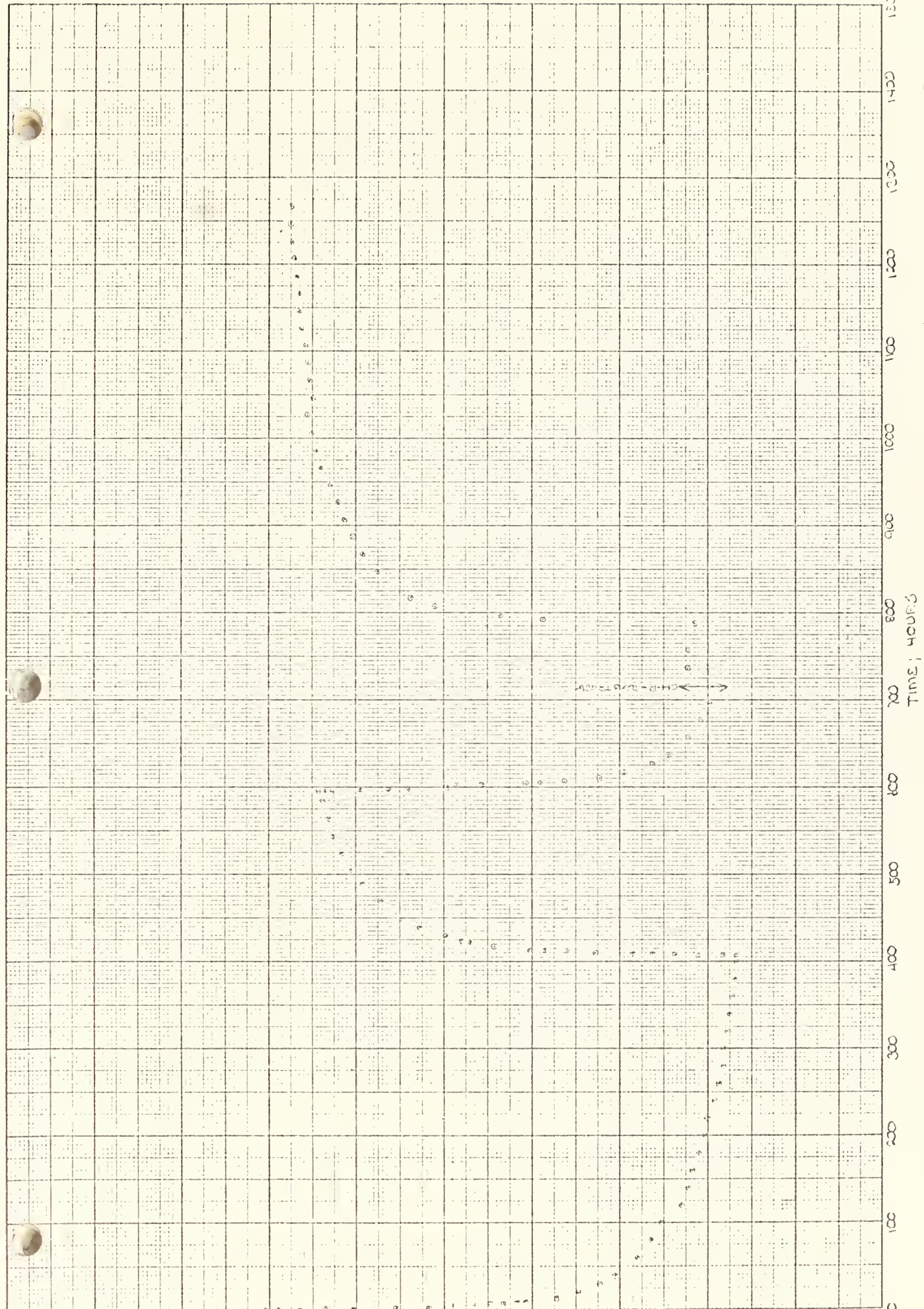
10E 20 X 20 TO THE INCH 47 1242

11 B-1145

Expanded Scale



[illegible]



Pressure in PSI - corrected

Time, hours

LOWEST MEASURED POINT 1001 : 11-10 : 11-10 : 11-10

000

Pressure in PSI - corrected

200

300

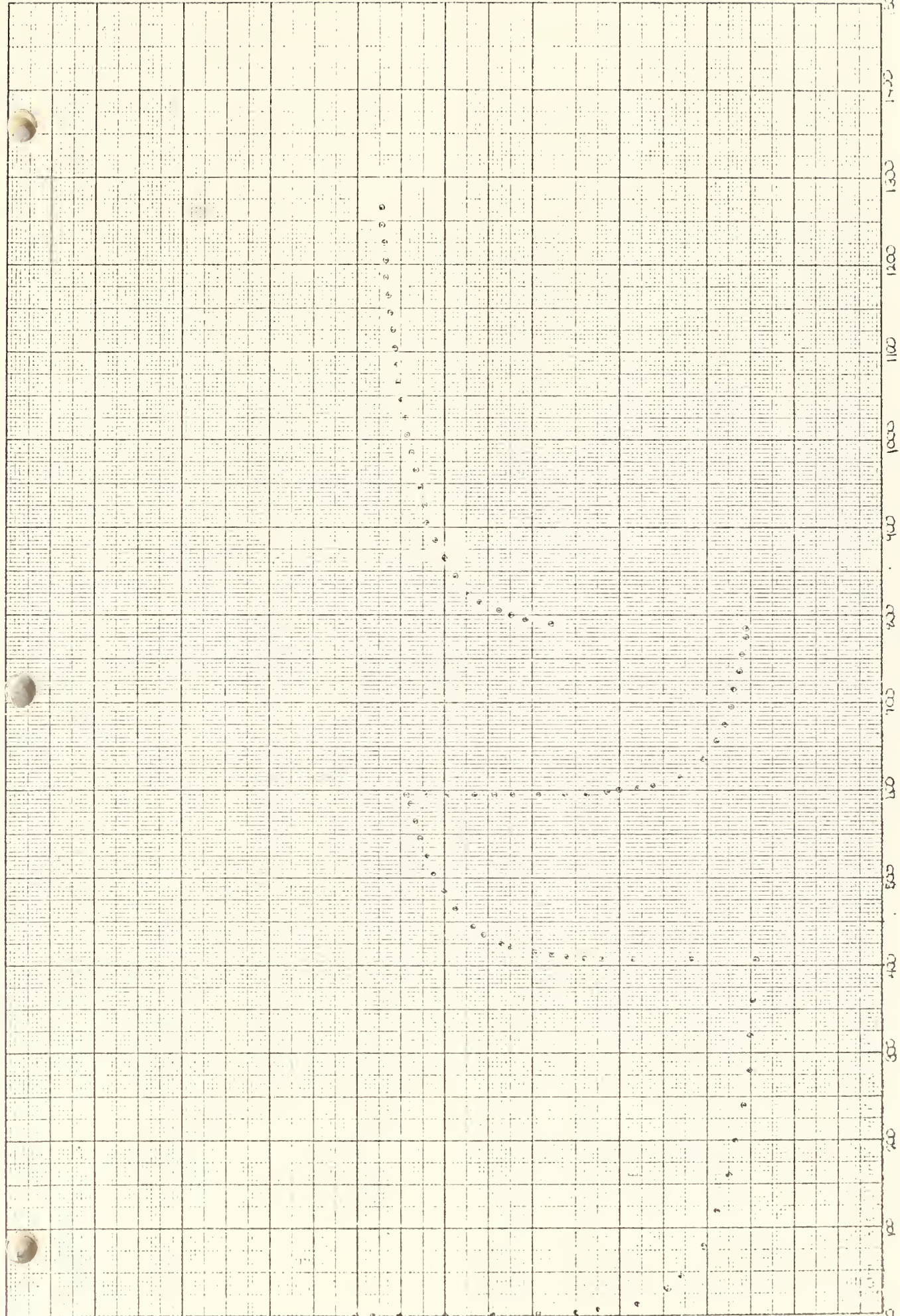
II B-1150

K&E 20 x 20 TO THE INCH A7 1242
REPUTED A K&E CO. PRODUCT

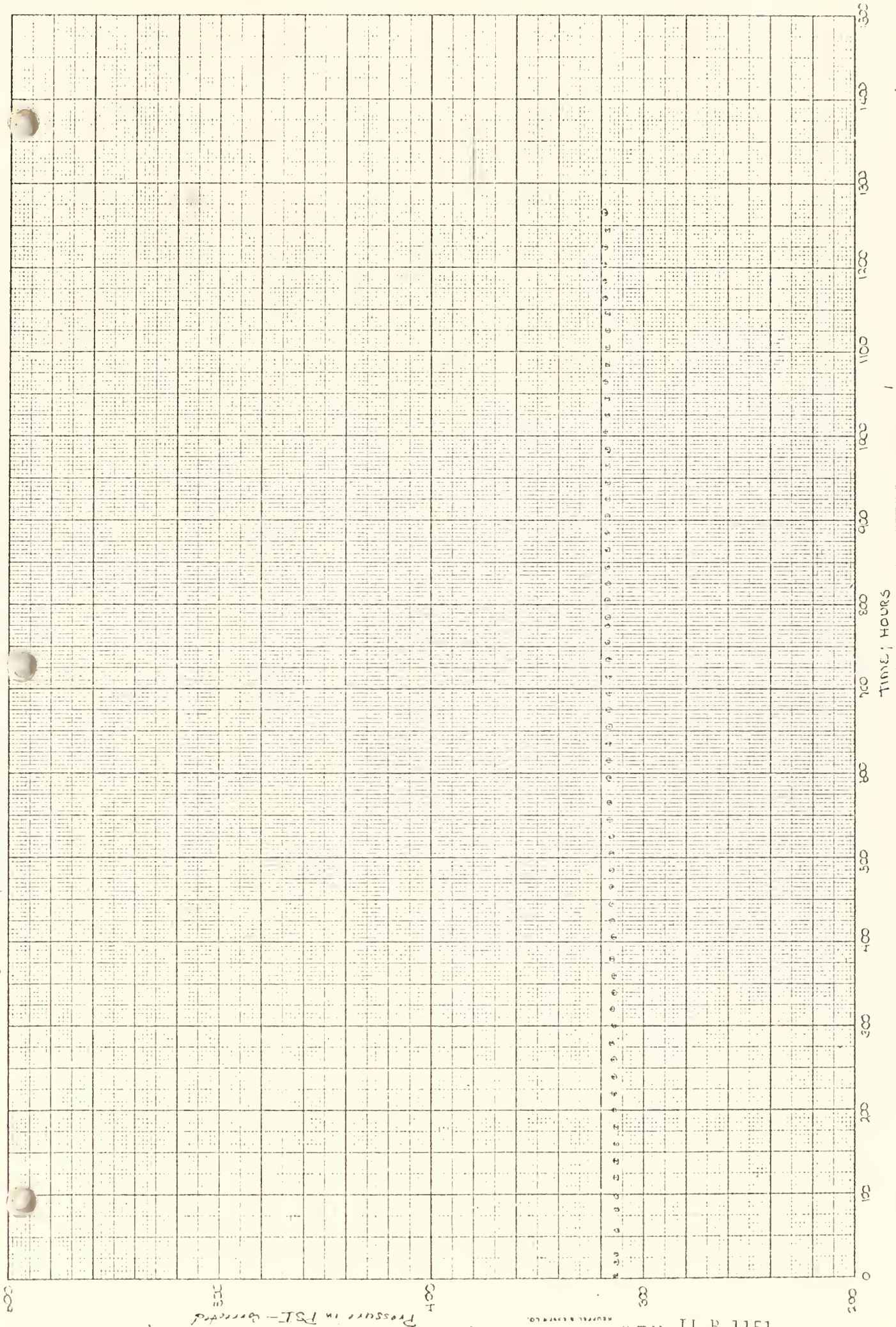
400

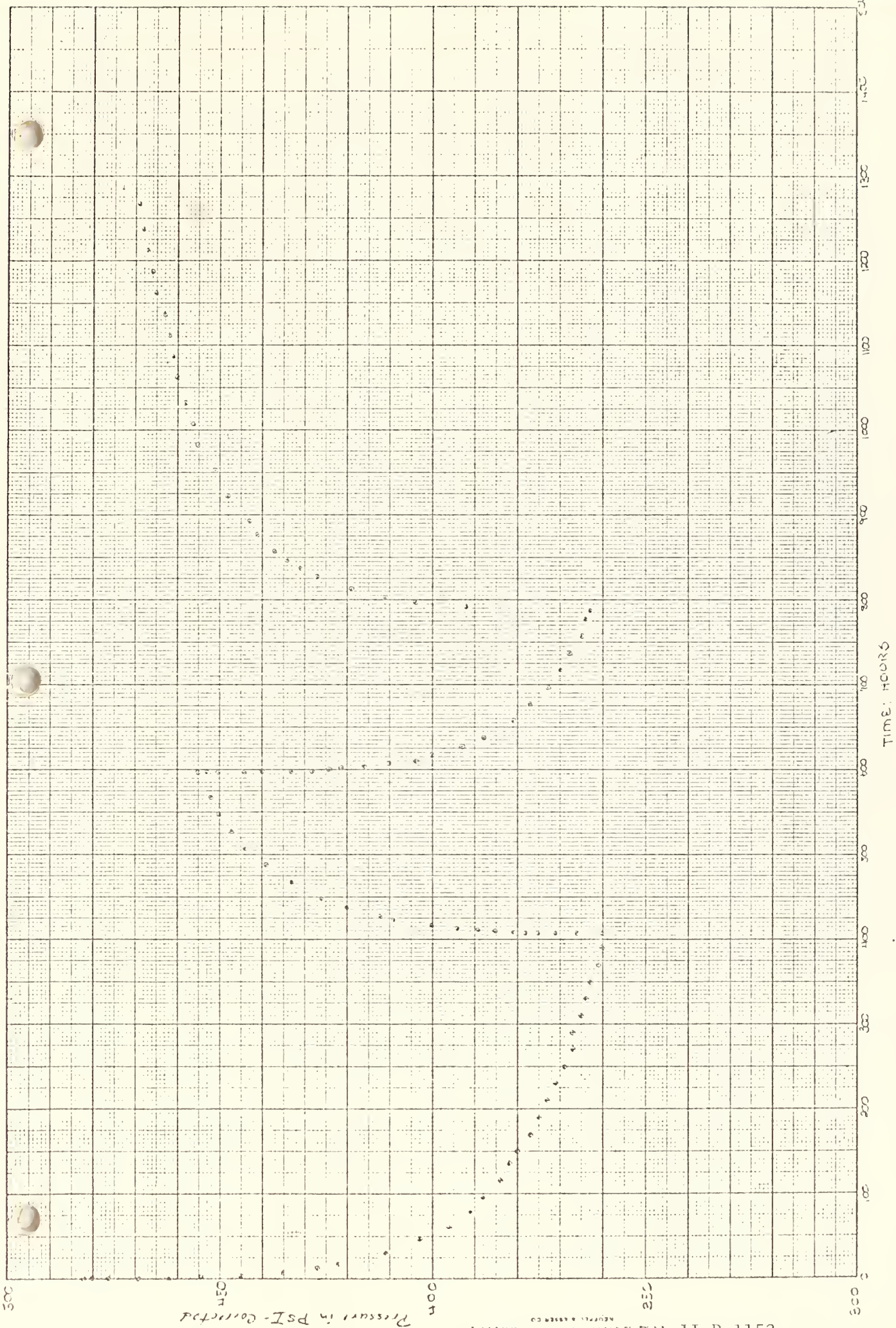
TIME, HOURS

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500



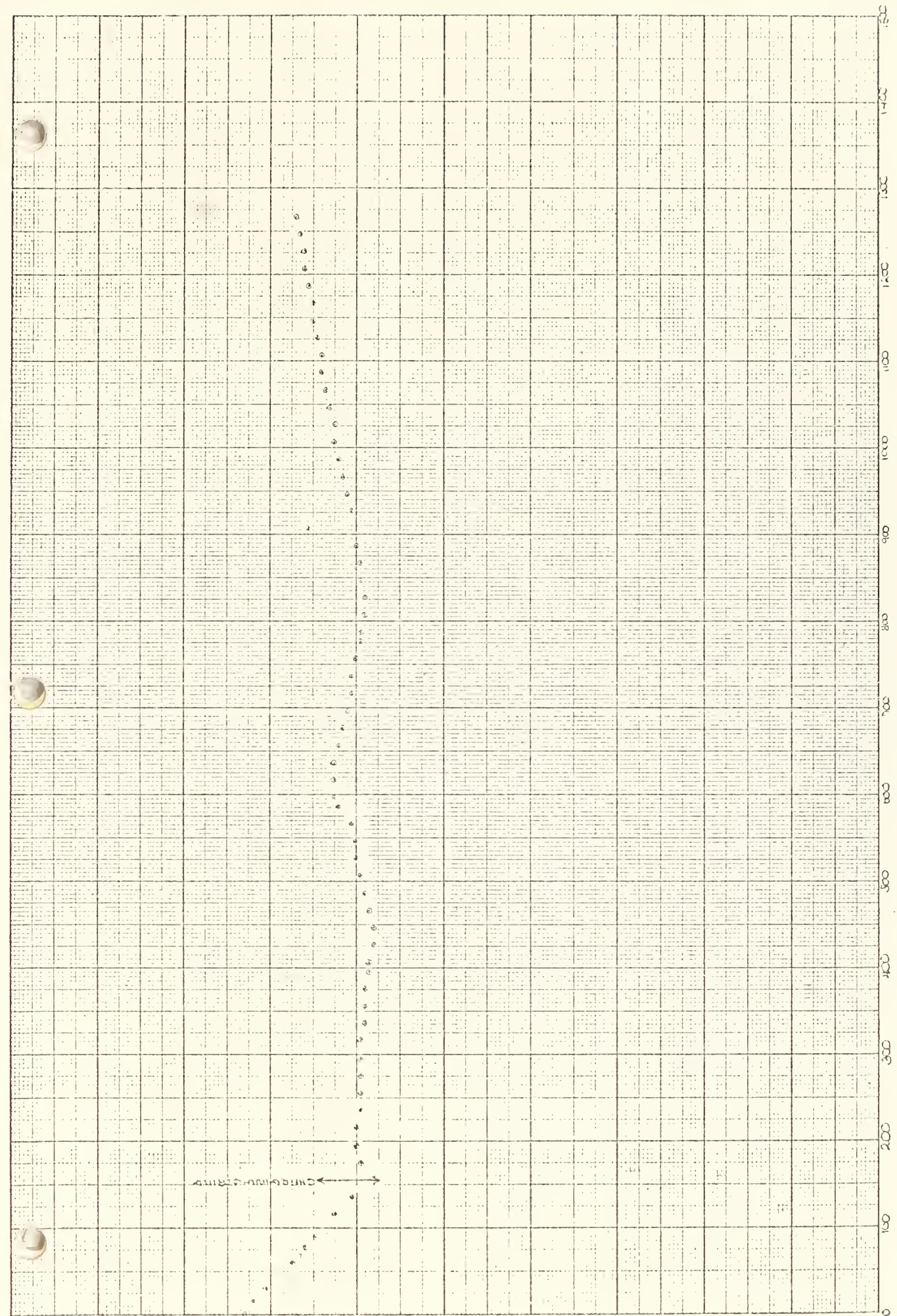
Lower Aquifer Pump Test: At-1C String #3



[illegible]

Pressure in PSI - corrected

II B-1152



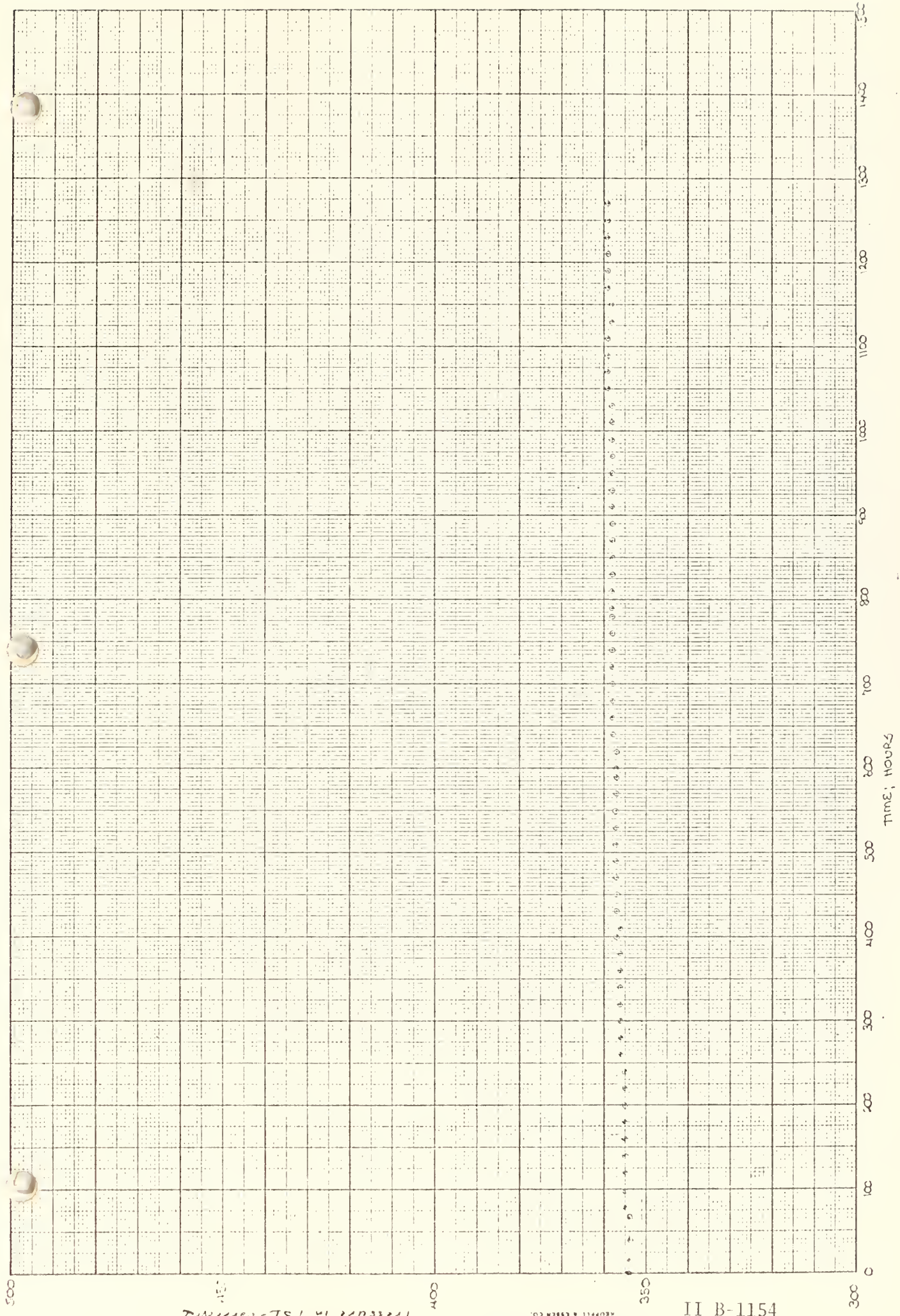
Time, Hours

Pressure in PSI - corrected

II B-1153

KE 20 x 20 TO THE INCH 47 1242
REDFIELD & CO. INC. NEW YORK, N.Y.

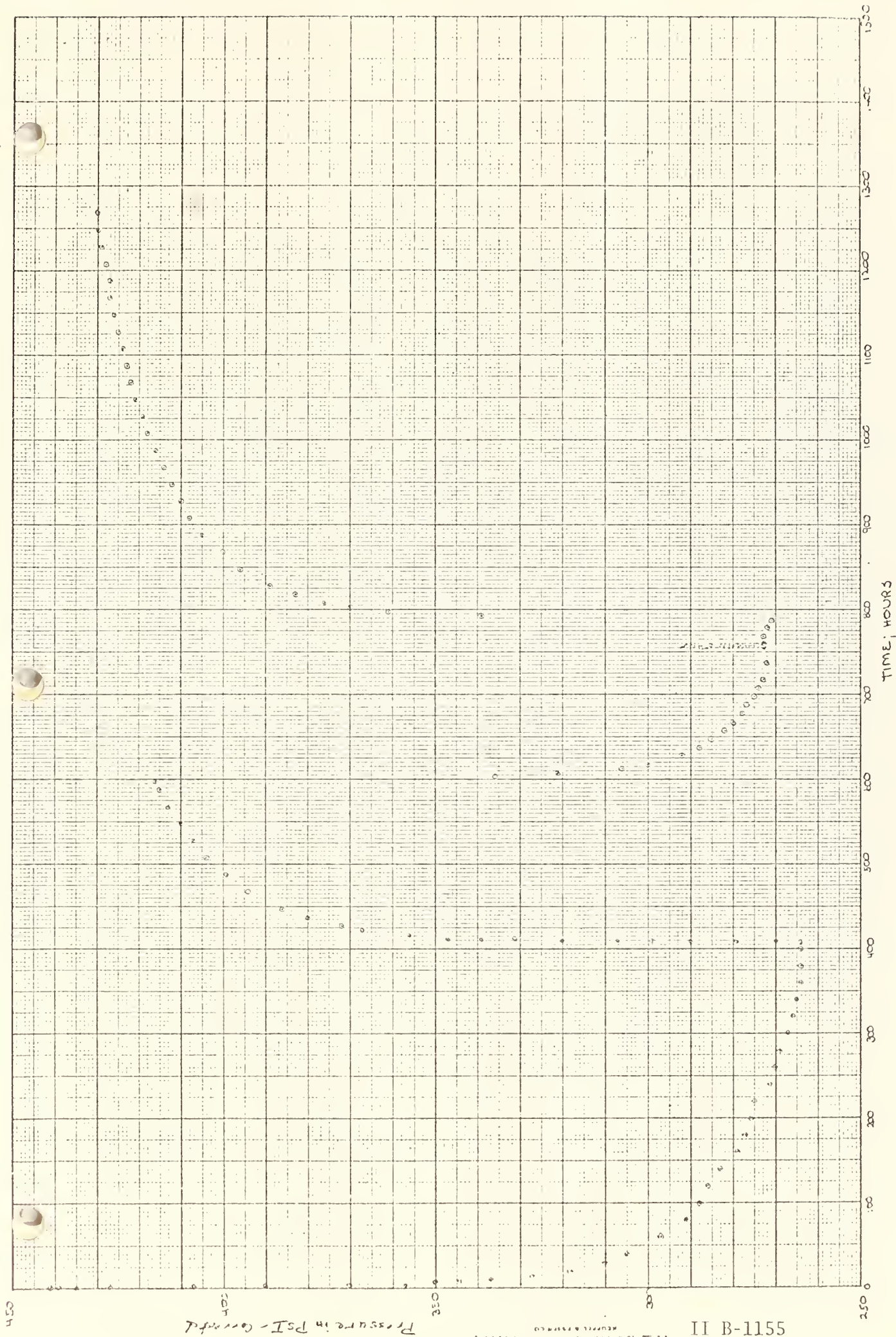
LOWER EQUIPER PUMP TEST: AT-1A TRAINING #3



K-11 20 x 20 TO THE INCH 47 1242
KEUFFEL & ESSER CO. MADE IN U.S.A.

II B-1154

LOWER ARQUIFER PUMP TEST: AT-10 OF KIDNEY INT



KEE 20 X 20 TO THE INCH A7 1242
REURTEL & PAPER CO. PRINTED IN U.S.A.

II B-1155

○
1-1
↑

8

50

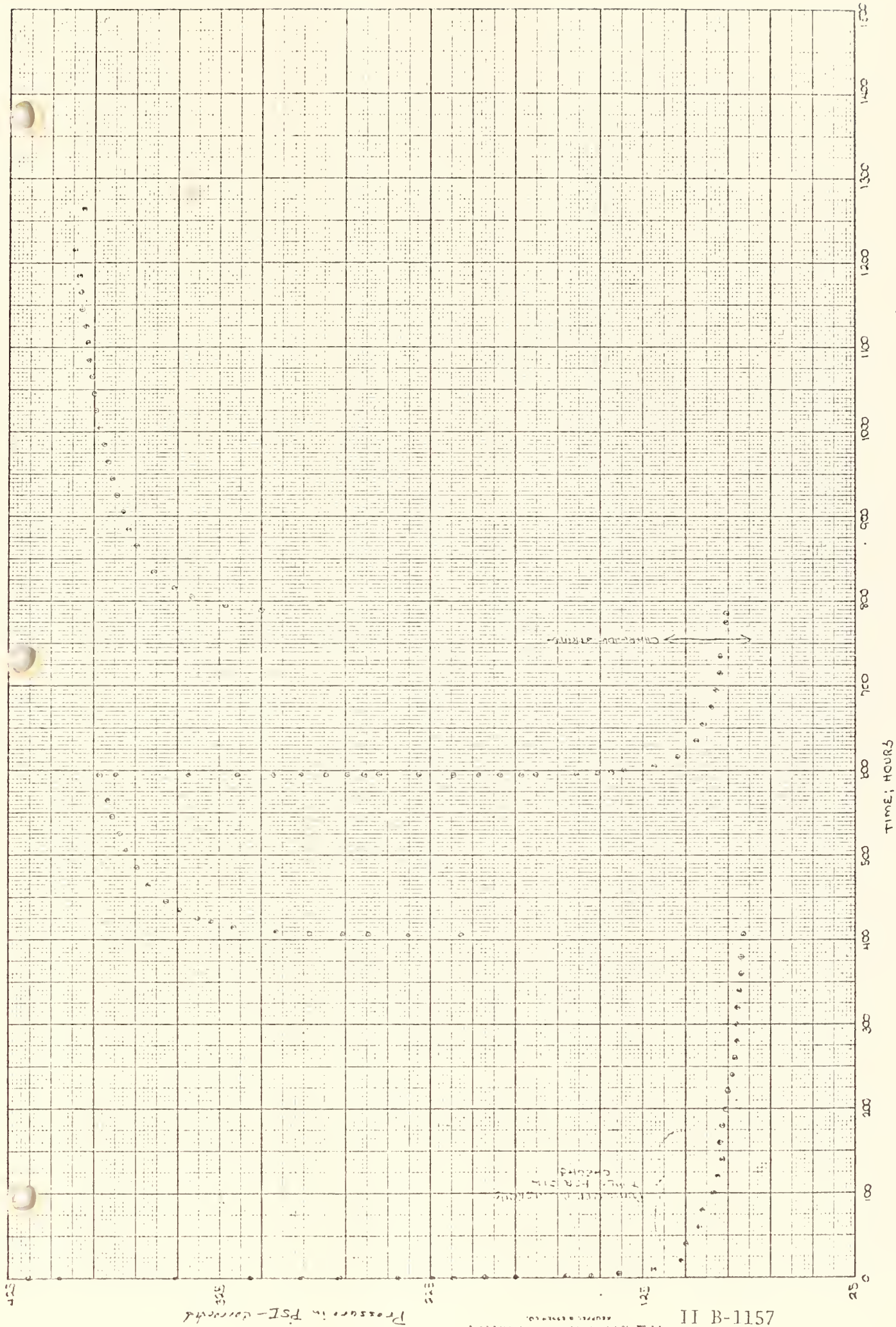
20 x 20 TO THE INCH 47 1242

8

II B-1156

TIME, HOURS

LOWER AQUIFER TEST / AT-1



Lithology

Lower Aquifer Pump Test

AQUIFER DATA
ALLUVIAL WELL PUMP TEST

TABLE II B-55

ALLUVIAL WELL A#1 PRODUCTION 6.11 gpm
 Measured 4-23-75 Starting 1129 hours
 Static Water Level 46.82 ft.

Drawdown		Recovery	
Column #1	Column #2	Column #1	Column #2
time of measurement from 0 = 1129 hours + minutes	drawdown in feet (-) from 0 = 46.82 feet below land surface	time of measurement from 0 = 1309 hours + minutes	recovery in feet (-) from 0 = 46.82 feet below land surface
0	0	0	0
1	0.59	1	.55
2	0.63	2	.62
3	0.675	3	.66
4	0.70	4	.68
5	0.705	5	.70
6	0.715	6	.71
7	0.730	7	.71
8	0.730	8	.72
9	0.730	9	.72
10	0.725	10	.725
12	0.735	12	.73
14	0.740	14	.74
16	0.745	16	.75
18	0.745	18	.75
20	0.745	20	.76
25	0.745	25	.76
30	0.750	30	.76
35	0.750	35	.76
40	0.755	40	.765
45	0.755	45	.77
50	0.755	50	.77
60	0.755	60	.77
70	0.760	70	.77
80	0.765	80	.77
90	0.760	90	.77
100	0.762		
120	0.760		
140	0.760		
160	0.760		
180	0.750		
temperature 12.5°C	conductivity 2200 ohms		

Page 12 of 12
Date: 11/11/2011
Time: 11:11 AM
User: [illegible]

Date	Description	Amount	Balance
11/11/2011	[illegible]	[illegible]	[illegible]
11/11/2011	[illegible]	[illegible]	[illegible]
11/11/2011	[illegible]	[illegible]	[illegible]
11/11/2011	[illegible]	[illegible]	[illegible]
11/11/2011	[illegible]	[illegible]	[illegible]
11/11/2011	[illegible]	[illegible]	[illegible]
11/11/2011	[illegible]	[illegible]	[illegible]
11/11/2011	[illegible]	[illegible]	[illegible]
11/11/2011	[illegible]	[illegible]	[illegible]

TABLE II B-56
ALLUVIAL WELL A#2 PRODUCTION 6.11 gpm
Measured 4-14-75 Starting 13:05 hours
Static Water Level 14.06 ft.

Drawdown		Recovery	
Column #1	Column #2	Column #1	Column #2
time of measurement from 0 = 13:05 hours + minutes	drawdown in feet (-) from 0 = 14.06 feet below land surface	time of measurement from 15:45 hours + minutes	recovery in feet (-) from 0 = 14.06 feet below land surface
0	0	0	5.72
1	2.8	1	3.0
2	3.25	2	2.15
3	3.7	3	1.79
4	3.93	4	1.59
5	4.03	5	1.40
6	4.15	6	1.27
7	4.29	7	1.16
8	4.37	8	1.18
9	4.47	9	1.12
10	4.56	10	.95
12	4.77	12	.83
14	4.94	14	.75
16	5.04	16	.69
18	5.12	18	.63
20	5.20	20	.58
25	5.28	25	.48
30	5.41	30	.40
35	5.47	35	.33
40	5.55	40	.28
45	5.60	45	.25
50	5.60	50	.21
60	5.58	60	.15
70	5.67	70	.10
80	5.68	80	.05
90	5.69	90	.05
100	5.69	100	.01
120	5.72	120	-.03
140	5.74	140	-.05
160	5.76	160	-.07
180	5.72	180	-.09
200	5.67	200	-.10
220	5.67	220	-.11
240	5.72	240	-.12
average temperature 11.0°C	average conductivity 1300 ohms		

Date	Description	Debit	Credit
1900	To Balance		
1901	By Balance		
1902	By Balance		
1903	By Balance		
1904	By Balance		
1905	By Balance		
1906	By Balance		
1907	By Balance		
1908	By Balance		
1909	By Balance		
1910	By Balance		
1911	By Balance		
1912	By Balance		
1913	By Balance		
1914	By Balance		
1915	By Balance		
1916	By Balance		
1917	By Balance		
1918	By Balance		
1919	By Balance		
1920	By Balance		
1921	By Balance		
1922	By Balance		

TABLE II B-57
ANALYTICAL SUMMARY
ALLUVIAL WELLS.

#A1 - Drawdown (late data) $T = 67,210$ gpd/ft.

Recovery (early data) $T = 10,082$ gpd/ft.

#A2 - Drawdown (early data) $T = 881$ gpd/ft.

Recovery (late data) $T = 2,688$ gpd/ft.

The range between early and late data analyses is the result of hole effects on the early data in general; the late data of these analyses will be the figure used.

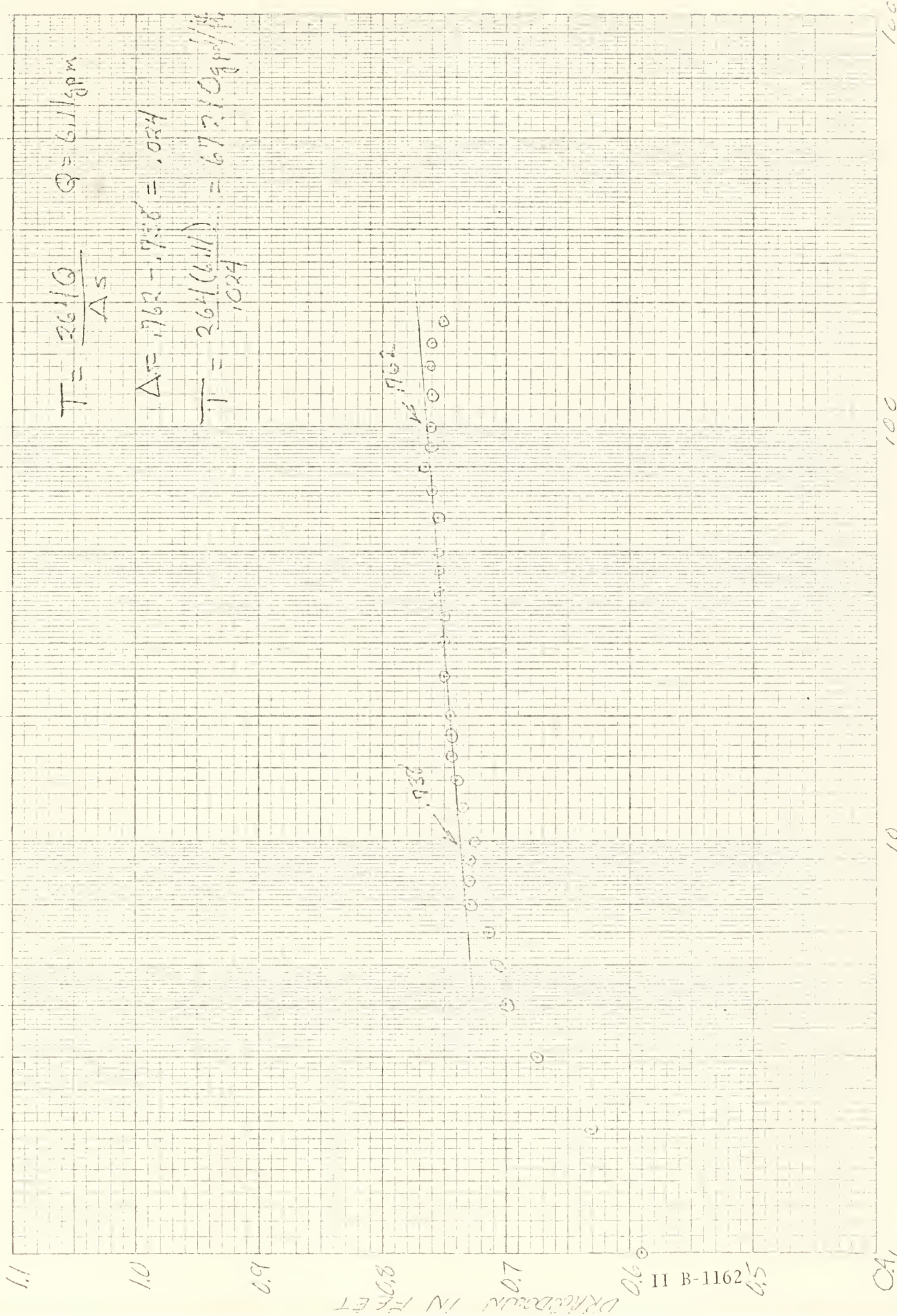
1900
1901
1902

1903
1904

1905
1906

1907
1908

A-1 DRAWDOWN APRIL 23, 1975



DRAWDOWN IN FEET
11 B-1162

A-1 Recovery April 23, 1975

$$t = \frac{2640}{\Delta S}$$

$$Q = 6.119 \text{ PM}$$

$$\Delta S = .877 - .719 = .16$$

$$T = 100 \pm 1.5 \text{ gpm/hr}$$

150

0.9

0.8

0.7

0.6

0.5

II B-1163

0.4

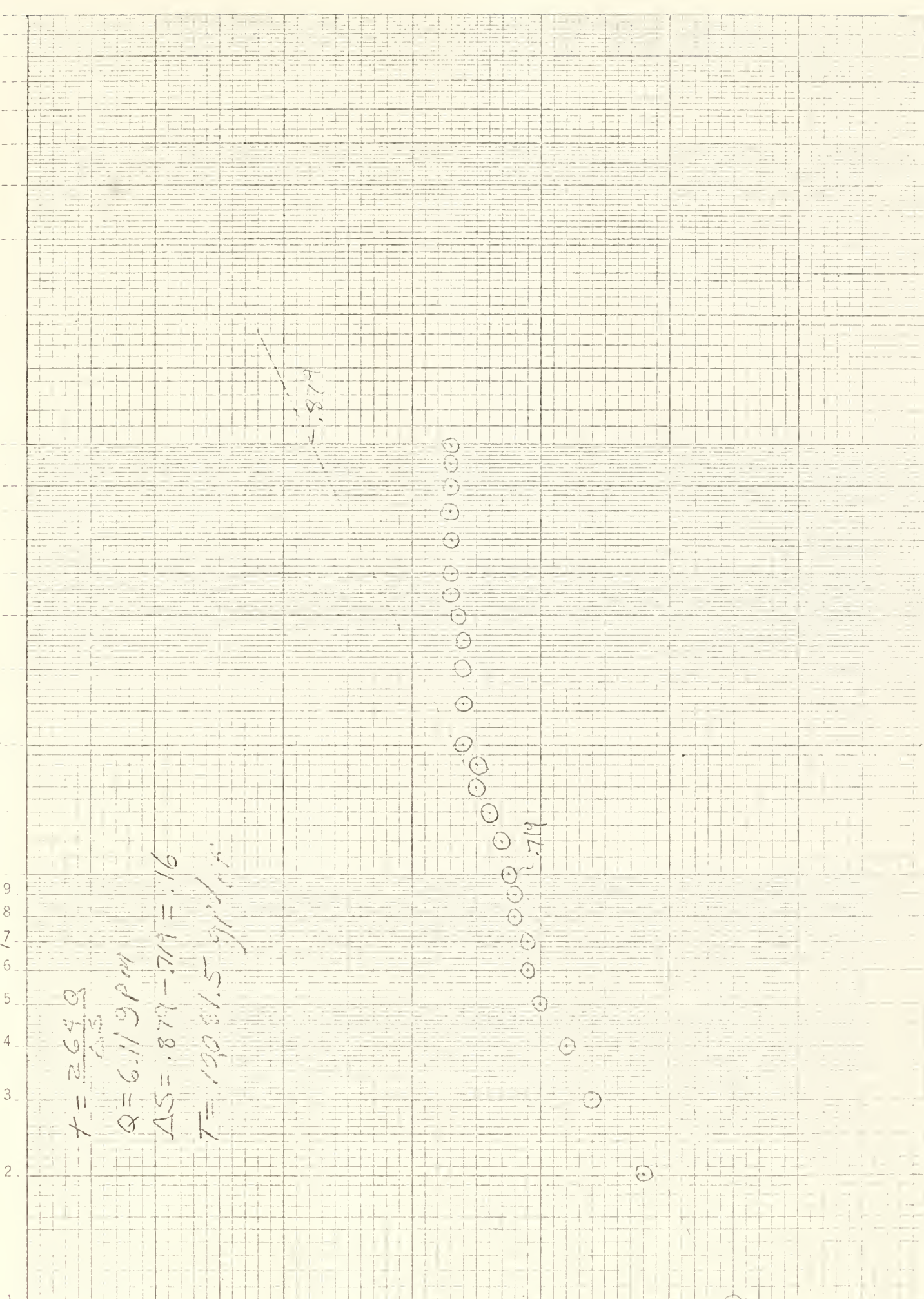
0.3

0.2

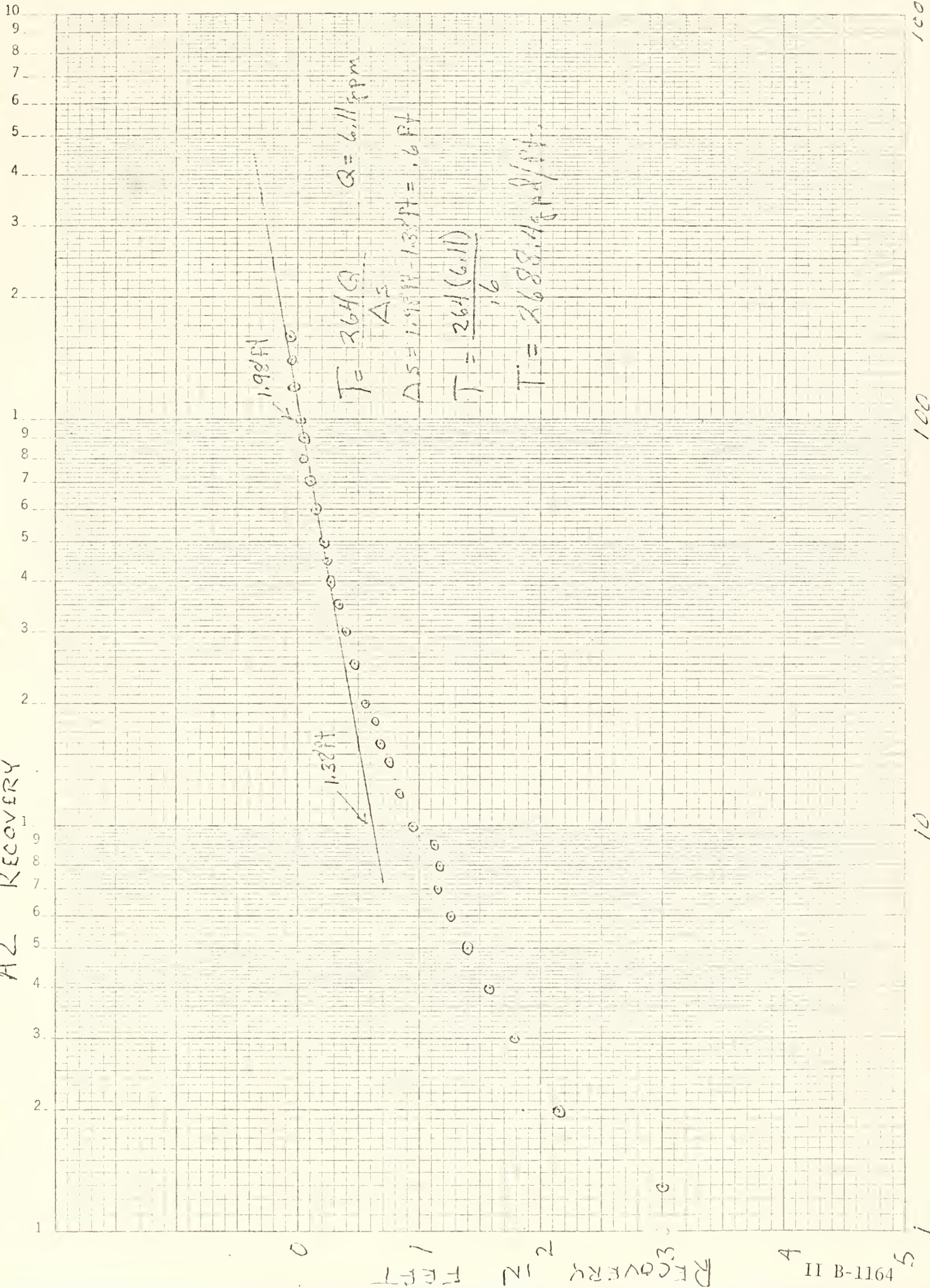
10

100

1000



A2 RECOVERY



100
MINUTES SINCE PUMP OFF

10

5

4

3

2

1

1

2

3

4

5

6

7

8

9

10

1

2

3

4

5

6

7

8

9

10

1

2

3

4

5

6

7

8

9

10

1

2

3

4

5

6

7

8

9

10

1

2

3

4

5

6

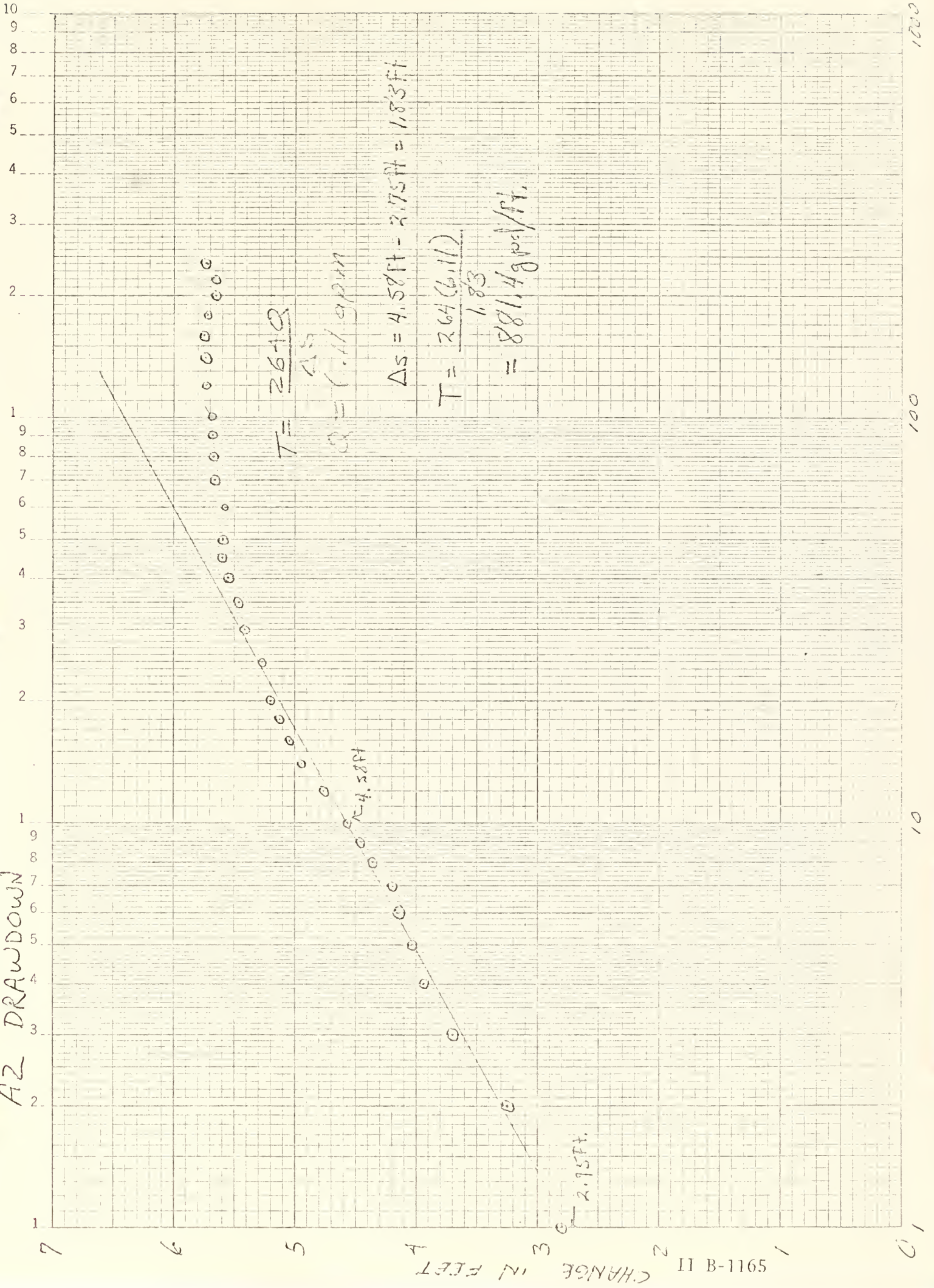
7

8

9

10

AZ DRAWDOWN



100

10

1000

MINUTES SINCE PUMP ON

J. Maho

A-1

DATE: APRIL 23, 1975 STARTING TIMING: 11:29 A.M.

STATIC WATER LEVEL: 46.82 SAMPLE TAKEN: YES

DRAWDOWN (in feet)

IN	ΔH_2O LEVEL	TEMP.	CONDUCT	GPM	MIN	H_2O LEVEL	TEMP.	CONDUCT.	GPM
0	0.0				90	0.760			
1	0.59				100	0.762			
2	0.63				120	0.760			
3	0.675				140	0.760			
4	0.70				160	0.760	12.5	2200	6.11
5	0.705				180	0.750			
6	0.715				200				
7	0.730				220				
8	0.730				240				

RECOVERY (in feet)

						MIN.	ΔH_2O LEVEL	MIN.	ΔH_2O LEVEL
9	0.730				0	0			
10	0.725				1	.55	20	.76	160
12	0.735				2	.62	25	.76	180
14	0.740				3	.66	30	.76	200
16	0.745				4	.68	35	.76	220
18	0.745				5	.70	40	.765	240
20	0.745			6.11	6	.71	45	.77	
25	0.745				7	.71	50	.77	
30	0.750				8	.72	60	.77	
35	0.750				9	.72	70	.77	
40	0.755				10	.72 ⁵	80	.77	
45	0.755			6.11	12	.73	90	.77	
50	0.755				14	.74	100		
60	0.755				16	.75	120		
70	0.760				18	.75	140		
80	0.765								



J. Morris

A 2

DATE: APRIL 14, 1975 STARTING TIMING 1.305 Hours

STATIC WATER LEVEL: 14.06 SAMPLE TAKEN: YES

DRAWDOWN (in feet)

IN	ΔH_2O LEVEL-in	TEMP.	CONDUCT	GPM	MIN	H ₂ O LEVEL	TEMP.	CONDUCT.	GPM	
0	0				90	5.69	11.0	1300	6.11	55 gal / 4 min.
1	2.8				100	5.69	11.0	1300	6.11	"
2	3.25				120	5.72	11.0	1300	6.11	"
3	3.7				140	5.74	11.5	1300	6.11	"
4	3.93				160	5.76	11.0	1300	6.11	"
5	4.03				180	5.72	10.5	1300	6.11	"
6	4.15				200	5.67	10.5	1300	6.11	"
7	4.29				220	5.67	10.5	1300	6.11	"
8	4.37				240	5.72				

RECOVERY (in feet)

IN	ΔH_2O LEVEL-in	TEMP.	CONDUCT	GPM	MIN	H ₂ O LEVEL	TEMP.	CONDUCT.	GPM	ΔH_2O LEVEL
10	4.56				0	5.72	MIN.	ΔH_2O LEVEL	MIN.	ΔH_2O LEVEL
12	4.77				1.3	3.0	20	.58	160	-.07
14	4.94				2	2.15	25	.48	180	-.09
16	5.09				3	1.79	30	.40	200	-.10
18	5.12				4	1.59	35	.33	220	-.11
20	5.20				5	1.40	40	.28	240	-.12
25	5.28	11.5	1250		6	1.27	45	.25		
30	5.41			6.11	7	1.16	50	.21		
35	5.47				8	1.18	60	.15		
40	5.55	11.0	1300	6.11	9	1.12	70	.10		
45	5.60				10	.95	80	.05		
50	5.60	11.0	1300	6.11	12	.83	90	.05		
60	5.58				14.33	.75	100	.01		
70	5.67	11.0	1300	6.11	16	.69	120	-.03		
80	5.68	11.0	1300	6.11	18	.63	140	-.05		

II B-1167



II B-10 LITHOLOGIC LOGS

The lithologic logs present a description of rock types encountered in a core hole. The detail of description varies with depth and operation. In most cases, however, the lithology is described from drill cuttings on ten-foot intervals above the "A" groove. In the lower zones, the lithology is described from cores on one-foot intervals.

In addition to providing a means for describing lithology, the litholog presents data such as information on structural dip, joints, fractures, and general rock quality data. These data are entered in the lithologic log at the appropriate depth.

The final lithologic logs for the following wells are included in this section of the Third Quarterly Report:

AT-1a	SG-10
SG-1	SG-11
SG-6	SG-17
SG-8	SG-18
SG-9	SG-19

For information on lithologic logs compiled for other wells, refer to the Well Summary Table II B-1.

LOGS CONSIDERED SENSITIVE

ASK PERMISSION OF AOSS TO SEE LITH. LOGS

